

EMPLOYEE FRAUD; EASY DOES IT?

A STUDY ON THE RELATIONSHIP BETWEEN AN EMPLOYEE'S POSITION AND THE EASE BY WHICH FRAUD CAN BE COMMITTED

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ABSTRACT

Employee fraud is an attack from within the organization, by those who were trusted to protect the organization's assets and resources. Any company can be affected. It costs about 5% of an average organization's total revenue per year. Globally this causes an estimated yearly loss of 4,5 trillion US dollars. Opportunities for occupational fraud primarily arise due to weaknesses in the internal control mechanisms. Some employees can more easily spot these weaknesses and exploit them. Occupational fraud is more often committed by intelligent, experienced, and high positioned employees. The position in the organization can determine one's position of trust and (informal) authority, the extent to which an employee has access to fraud opportunities, and the likelihood to have the right capabilities to exploit these. One's function and tenure can define this position. Hypotheses are deducted from 'The New Fraud Triangle Model' proposed by Kassem & Higson (2012), and these insights are complemented with other relevant scientific research. Briefly summarized, 'The New Fraud Triangle Model' uses four factors to understand fraudulent behaviour: (1) *motivation*, (2) *personal integrity*, (3) *opportunity*, (4) *capabilities*.

This study examines whether an employee's high(er) function or long(er) employment has a positive effect on the ease by which fraud is committed. It was expected that these employees have access to more opportunities and are more likely to have the necessary capabilities to exploit these. Furthermore, it investigates whether these relationships are stronger for older employees. 450 fraudsters are included in this study. The data was provided by Hoffmann, a private security firm and investigation agency. Its private detectives filled in an administrative form based on their extensive investigation into the organizations of fraudsters and conversations with them. This study tests this data with binary logistic regression models. Significant results were found regarding the relationship between an employee's length of employment and the ease by which fraud can be committed. However, the results indicate that there is no relationship between an employee's function and the ease by which fraud is committed. Furthermore, neither of the relationships are moderated by age.

Keywords: Fraud, Occupational fraud, Employee fraud, The New Fraud Triangle Model, Opportunities, Capabilities, Organization, Position, Trust, Power, Length of employment, Tenure, Function, Age, The ease by which fraud is committed, Quantitative research, Binary logistic regressions, Hoffmann

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STRUCTURE OF THE STUDY

Chapter one starts with an introduction that elaborates on the societal relevance of employee fraud. Furthermore, in this introduction the research questions are formulated, and the scientific relevance of this study is discussed. In chapter two, hypotheses will be logically deduced from the theoretical framework, i.e. 'The New Fraud Triangle Model' (Kassem & Higson, 2012), complemented with other relevant scientific research. In chapter three, the data and methods of this study are described. The fourth chapter demonstrates the results. All data is analyzed in 'SPSS' using binary logistic regression models. In chapter five, the findings will be discussed, including possible limitations. Recommendations will be made for future research. The final section will conclude with policy advice for organizations.

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**Overall note: where he/his is written she/her can be read.*

1. INTRODUCTION

1.1 The societal relevance of employee fraud

This study is about occupational fraud, also called employee fraud. According to the Association of Certified Fraud Examiners (ACFE, 2021, p.1) employee fraud is: “the use of one’s occupation for personal enrichment through the deliberate misuse or misapplication of the organization’s resources or assets”. The subject holds significant societal relevance for four reasons.

In the first place: of all kinds of fraud, occupational fraud poses the largest financial threat and any company in the world could be affected by it (ACFE, 2018; Fathi et al., 2017). On average, it costs about 5% of an organization’s total revenue per year, which amounts to an estimated yearly global loss of 4,5 trillion US dollars (ACFE, 2020). In the Netherlands, yearly, two out of ten companies are confronted with occupational fraud and the estimated total financial damage is 200 million euros annually (HR-kiosk, 2019).

The second reason why employee fraud is a relevant issue for society is that it forces organizations to apply internal control mechanisms that burden a flexible way of working, decrease worker’s autonomy and motivation and bring about extra costs in administration (Law, 2011; Winter, 2019; Pink, 2011).

Thirdly, employee fraud is a serious breach of trust, not only between employer and the fraudulent employee but also between employees by tainting internal relations (Cressey, 1950; Sampson, 2014). And trust is a key element for any organization’s success (Bastug et al., 2016).

Finally, employee fraud can badly damage an organization’s reputation and business relations (Law, 2011). A recent Dutch example is that of the prestigious notary office ‘Pels Rijcken’; the firm suffered major reputational damage when it turned out that the former chairman of the board committed fraud for years and transferred millions of euros to his bank account (Baneke, 2021; Knapen, 2021).

Thus, if this study in any way helps to prevent or diminish employee fraud, it will contribute to save money, reduce the need for control mechanisms, and buffer internal and external trust in organizations.

1.2 Research questions and the scientific relevance

In our digitalized society, fraud detection and prevention schemes primarily focus on technology that dissects texts and numbers to flag suspicious data (Sampson, 2014).

However, as history and statistics show, technology cannot prevent all fraud; individuals still

scheme the systems (Button & Cross, 2017). Sampson (2014, p.2) states: “It is people, real people, who commit fraud. People, unlike systems, have intentions, strategies, skills, networks, values and routines”. Thus, it is essential to adopt a point of view based on the individual (i.e. the employee) and investigate who these ‘real people’ are.

Therefore, this study uses the following *descriptive question*:

“What are the characteristics of employees who commit fraud?”

Organizations can structurally limit fraud by diminishing the opportunities (Suh et al., 2019; Buckhoff, 2002). A proper internal control system does just that and thus greatly reduces fraud and – the other way around – fraud is more likely to occur if these controls have weaknesses (Rae & Subramaniam, 2008).

In that sense, the descriptive question can be rephrased to:

“What are the characteristics of employees who can more easily spot and exploit weaknesses in the internal control systems?”

One can assume that employees will need less effort to commit fraud if they are exposed to more opportunities and have the necessary (intellectual) capabilities (Kassem & Higson, 2012; Wolfe & Hermanson, 2004). In other words, it will be easier for them to spot and exploit potential weaknesses compared to employees who do not (or have less) access to opportunities and the corresponding capabilities to exploit these.

Vona (2012) states that an employee’s position in an organization can determine whether there are opportunities to commit fraud. This position is interchangeably linked with the fraudster’s capabilities to create and exploit these opportunities. According to Wolfe and Hermanson (2004), an employee’s position is the initial factor that indicates whether they have the capabilities to commit fraud. An employee’s function or length of employment can determine a person’s position (e.g. of trust or power). For example, those in managerial or executive roles are not only occupying an authoritative function, but are also sooner viewed as trusted (Holtfreter, 2005; Friedrichs, 2002). Furthermore, a longer tenure can also imply having more responsibilities, (informal) authority, and improved trust relations (Gagliardi, 2014; ACFE, 2020; Boselie, 2014). It can thus be assumed that an employee’s function and length of employment are important indicators of an employee’s position in an organization that can determine the opportunities and capabilities to commit fraud. And thus, how ‘easy’ committing fraud might be.

Therefore, this study aims to answer the following *explanatory research question*:

“To what extent can an employee’s position (function and length of employment) explain the ease by which fraud can be committed?”

The current study examines the extent to which an employee’s position (function and length of employment) affects ‘the ease’ and investigates whether the effects are moderated by age. Mackevicius & Giriunas (2013) state that scientific research investigating fraud motivations by age has not been done yet. Previous research primarily examines whether certain age groups are more likely to commit fraud (Holtfreter, 2005; Mackevicius & Giriunas, 2013; Fathi et al., 2017). This study distinguishes itself by examining whether the increase in the age of fraudsters strengthens the relationship with one particular motivation, namely ‘it was easy’.

The research questions are answered by using Dutch data provided by the private security firm Hoffmann. The current study contributes to the field of research because it investigates three personal characteristics (function, tenure, age) in relation to the ease of committing fraud. It emphasizes the importance to examine ‘the ease’ as a contributing factor to a fraudster’s incentive to commit fraud and the ability to rationalize their actions. Research that investigates explicitly for whom employee fraud might be easier has not been done before. ‘Ease’ is not a common measure in scientific research that investigates employee fraud. However, conducting systematic research into ‘the ease’ seems utterly important because among the 450 fraudsters in this study ‘it was easy’ is assessed to be the most common motivation (24.2%). The current study is in a unique position to use information about the ease of committing fraud based on the professional judgement of experienced private detectives who do extensive research into each of the organizations where an actual fraudulent act occurred. In this judgement, information about the fraudster’s perceived ease is also weighed in by conducting interviews with the fraudsters. The determination of the ease is thus specifically assessed for each individual fraudster and the specific organization in which the fraudster is employed.

In contrast, previous research mainly focuses on general risk factors or proxy measures of opportunities and capabilities to predict the possibility of occupational fraud occurrence (Christian et al., 2019; Roden et al., 2016; Aghghaleh & Mohamed, 2014; Lou & Wang, 2009; Shelton, 2014; Fathi et al., 2017). Risk factors like complicated financial transactions, turnover of the board of directors, the nature of the industry, or certain personality traits. Moreover, the data used by these researchers is often limited because it originates from the

organization's (official) statistics like proxy- and financial statements, open data sources, and company surveys that were sent to non-fraudulent employees to assess potential risks. However, generally fraud is underrepresented in official statistics and police data because only a small proportion is actually reported to and recorded by these systems (Tunley, 2014). Organizations are often afraid of reputational damage; they want to prevent the fraudulent act from being publicized. Thus, organizations would initially want to prevent publishing their fraud-related data in (official) statistics or open sources. Organizations hire private detective agencies, like Hoffmann, who handle the fraud cases discreetly. Therefore, testing and describing the data used in this study can be very insightful and contribute to research because it can shed some light on the dark figure of fraud.

The knowledge from this study can be used to advise organizational policymakers by answering the related *policy question*:

“How can organizations best use this knowledge to prevent and limit employee fraud?”

If it is known for whom occupational fraud is easier, the structural measures to limit fraud can focus on these particular employees.

2. THEORY

Research has found that fraudsters are more likely to hold managerial and executive roles (i.e. 55% of fraudsters) and have a long tenure – length of employment or also called organizational age – with the organization (ACFE, 2020; Fathi et al., 2017). Furthermore, fraudsters in high(er) functions or with a long(er) tenure also cause more financial damage (ACFE, 2020; Carroll, 2015). This could indicate that these employees might also be more effective in committing fraud. As previously indicated, one's function level or tenure can define an employee's position (of trust and power) in an organization. Research states that: “the higher the position that an employee holds, the more likely the employee to commit fraud” (Fathi et al., 2017, p.82). Other researchers confirm these insights (Wolfe & Hermanson, 2004; Prasmaulida, 2016; Holtfreter, 2005; Beasley et al., 1999). How can this be understood?

2.1 The New Fraud Triangle Model; four factors

According to Cressey (1950), one can understand occupational fraud with the ‘Fraud Triangle’. The model suggests that what leads employees to commit fraud is a combination of opportunity, pressure, and rationalization. In 2012, Kassem & Higson proposed ‘The New Fraud Triangle Model’. This model combines the insights from the fraud models developed

over the years since Cressey's model in 1950. This led to four interrelated factors: (1) *motivation*, (2) *personal integrity*, (3) *opportunity*, and (4) *capabilities*.

Kassem & Higson (2012) emphasize that the new model should be seen as an extension to Cressey's model (1950) and stress the importance of considering all current fraud models to fully understand fraud. In this chapter, the most relevant insights from the fraud models will be combined in relation to the research questions.

'*Motivation*' and '*personal integrity*' will be briefly addressed to explain why 'the ease' should be seen as a contributing factor in motivating and rationalizing the decision of an employee to commit fraud, specifically for high positioned employees. In view of 'the ease' this chapter focuses on '*opportunity*' and '*capabilities*' in relation to function level, the length of employment, and the moderator age.

2.2 Factor 1 & 2; *Motivation & Personal integrity*

An individual's participation in a fraudulent act is justified by his beliefs (Kassem & Higson, 2012; Buckhoff, 2001). An employee's belief could be affected by financial pressures or strains that can motivate him to commit fraud. These strains could, under certain circumstances, result in employees adapting to the conventional routes to cope with these strains (Merton, 1938; Cressey, 1950; Buckhoff, 2001). The temptation of fraud arises when individuals perceive a financial problem as non-sharable, i.e. the person feels that he cannot solve it legitimately with ordinary sources, and he sees 'no other way out' (Cressey, 1986). Research indicates that approximately 95% of all fraudsters are financially motivated (Mansor & Abdullahi, 2015). Other researchers also show that financial pressures have the greatest influence on fraud occurrence (Prasmaulida, 2016; Tiffani & Marfuah, 2015; Lou & Wang, 2009).

The original 'Fraud Triangle' (Cressey, 1950) states that individuals rationalize their choice to commit fraud. The greater the pressure or strain, the higher the likelihood of the ability of an individual to rationalize their decision to commit fraud (Kassem & Higson, 2012). Rationalization is a major contributor to the perpetration of fraud (Kula et al., 2011). Fraudsters convince themselves that committing fraud is worth the risks (Wolfe & Hermanson, 2004). The perceived costs and benefits are weighed before committing fraud. The costs can be the effort and time needed, the risk of detection, possible punishment, and social and reputational costs (Andresen, 2019). Benefits can also be social or reputational but are often monetary because, as stated above, 95% is financially pressured.

In 'The New Fraud Triangle Model', the factor '*personal integrity*' also encompasses the

concept of moral reasoning as a form of rationalization (Kassem & Higson, 2012; Albrecht et al., 1984; Rae & Subramaniam, 2008). The fraudster formulates a morally acceptable reason to justify his engagement in unethical behaviour (Mansor & Abdullahi, 2015; Rae & Subramaniam, 2008). An employee could believe that the fraud is in the firm's best interest (Said et al., 2017). Or one might rationalize his choice by thinking: "It is just temporary", or "The company will do better next quarter and then I will reverse the small financial adjustment. No one will ever know" (Kenyon & Tilton, 2012, p. 247).

This current study proposes that a fraudster's intrinsic belief about their ease of committing fraud can contribute to their motivation and to their ability to justify their decision to do so. A fraudster who for example thinks: "The costs of committing fraud are low for me; it is easy for me to do. I can do this quickly; it does not cost me much time and effort because there are opportunities (*factor 3*) present that I can easily create and exploit because I have the right capabilities (*factor 4*). Hence, I will probably not get caught, and they will never know", is able to justify his unethical behaviour, which can subsequently motivate him to act upon his perceived non-sharable financial problem. Relating to the upcoming theoretical sections, it is expected that high positioned employees (i.e. those with a high(er) function or long(er) tenure) are more likely to justify their actions because 'it was easy'. This could provide explanations for why, as previously mentioned, these employees are more likely to commit fraud and cause more financial damage.

2.3 Factor 3; Opportunity

A fraudulent act cannot be committed unless there is an opportunity (Cressey 1950; Srivastava et al., 2005; Said et al., 2017). Opportunities mostly arise due to weaknesses (i.e. weak spots) in the internal control mechanisms, this occurs when an internal control is ineffective or when weaknesses in the governance system are present (Rae & Subramaniam, 2008; Mansor & Abdullahi, 2015). For example, when there is a lack of supervision or monitoring is ineffective and when duties are poorly separated (Kenyon & Tilton, 2012; Vance, 1983; Sanusi et al., 2015; Buckhoff, 2002). Many researchers confirm that opportunity significantly contributes to fraud occurrence (Kassem & Higson, 2012; Albrecht et al., 2010; Lister, 2007; Vona, 2012; Mansor & Abdullahi, 2015).

An employee's position of trust (or power; see section 2.4) in an organization can determine the presence of opportunities (Vona, 2012). According to Cressey (1950), a fraud opportunity arises when a person manages to find a way to abuse his position of trust. Bressler & Bressler (2007) also indicate that opportunities arise when organizations place (too much) trust in their

employees. Employees are more likely to abuse their position of trust if they know that they are not likely to get caught (Kassem & Higson, 2012; Cressey, 1950). And a trusted employee is less likely to get caught because they are less likely to be monitored, which subsequently improves their ability to spot gaps or weaknesses in internal controls (Carroll, 2015; ACFE, 2020). A manager or director is sooner viewed as trustworthy (Holtfreter, 2005; Friedrichs, 2004), and when the employee's length of employment increases, so does his internal perceived trustworthiness (Daigle et al., 2009; Gagliardi, 2014; ACFE, 2020). This position of trust provides the high positioned employees with relatively more opportunities compared to employees who are not in this trust position, which they can subsequently abuse to commit and conceal fraud (Said et al., 2017; ACFE, 2020; Gagliardi 2014; Daigle et al., 2009; Kassem & Higson, 2012).

2.4 Factor 4; Capabilities

Employees are less likely to commit fraud if they lack the capability to carry out the act (Mackevicius & Giriunas, 2013; Mansor & Abdullahi, 2015; Ruankaew, 2016). Thus, fraud is more likely to occur if an employee has the right capabilities (Wolfe & Hermanson, 2004). To assess the capabilities of fraudsters, Wolfe & Hermanson (2004) proposed four observable traits, of which three are relevant for this study, (Kassem & Higson, 2012, p.194); (*trait 1*) “authoritative position or function within the organization”, (*trait 2*) “capacity to understand and exploit accounting systems and internal control weaknesses”, (*trait 3*) “confidence that she/he will not be detected or if caught she/he will get out of it easily”.

Trait 1 directly reflects high positioned employees; they occupy a position of authority and are thus more likely to be in a position of power. A cumulation of power, e.g. of responsibilities and authorizations, tends to occur at the managerial – and especially – the directors level. Employees with a long(er) tenure are also more likely to have more responsibilities and to be in a position of (informal) authority (Gagliardi, 2014; ACFE, 2014; ACFE, 2020; Boselie, 2014). The power enables them to decide if, when, where, and how deals or contracts go into effect (Wolfe & Hermanson, 2004). This position of power is interchangeably linked with one's ability to create and exploit opportunities, an ability not available to employees who do not occupy an authoritative function (Schuchter & Levi, 2016; Kassem & Higson, 2012; Wolfe & Hermanson, 2004). Employees in an authoritative position often have access to more resources or certain areas where fraud opportunities are present; senior members can manage the internal controls, and as a result, they can manipulate or override them and create opportunities for fraud (Suh et al., 2019; ACFE, 2014; ACFE,

2020). ‘Management override’ is likely to be the primary reason for major fraud by senior members (Vona, 2012; Suh et al., 2019). Moreover, the power can also be used to coerce others to do something for them (e.g. concealing the fraud) or convince them to look away (Wolfe & Hermanson, 2004). This reduces their risk of detection and increases their confidence of not getting detected (*trait 3*). It also implies that they need less effort to conceal their fraudulent actions.

Capabilities: function

Experience and intelligence are also indicators of the capability to commit fraud, and these are needed to “understand and exploit accounting systems and internal control weaknesses” (*trait 2*; Wolfe & Hermanson, 2004; Kassem & Higson, 2012, p.194). An employee that occupies a high function is more likely to have the right skills and intellectual capabilities (Wolfe & Hermanson, 2004). Organizations want people in the higher job levels to be competent and invest time and budget in their recruitment and overall professional development, which increases the capability to commit fraud (Bhardwaj & Punia, 2013; Wolfe & Hermanson, 2004; Becker & Bish, 2017). When searching for a managerial or executive candidate, employers endeavour to find the right candidate with relevant previous experience, a significant amount of job knowledge, and the right competencies (e.g. continuous learning, tenacity, curiosity, persuasiveness, persistence, ambition, vision, strategic orientation, decisiveness, coordination, etc.) (Bhardwaj & Punia, 2013; Rao, 2007). Moreover, the candidates are often highly educated. Research shows that fraud perpetrators are indeed often highly educated and that a higher education improves one’s ability to spot internal control weaknesses (Holtfreter, 2005; ACFE, 2020; Carroll, 2015). It can thus be assumed that employees with a high(er) function have more intellectual capabilities that enable them to spot, understand, and exploit opportunities for fraud.

Capabilities: tenure

Longer tenure also implies more experience, and due to their experience, they are more likely to have the intellectual “capacity to understand and exploit accounting systems and internal control weaknesses” (*Trait 2*; Wolfe & Hermanson, 2004; Kassem & Higson, 2012, p.194; ACFE, 2020; Farr & Ringseis, 2002). Research shows that employees with a long(er) tenure are more likely to understand the business and the organization’s controls, mainly due to their experience (Daigle et al., 2009; Gagliardi, 2014; ACFE, 2014). Performing a certain set of tasks (in a function) repeatedly is likely to increase their knowledge of organizational processes and controls in the domain of their function (Wolfe & Hermanson, 2004). This

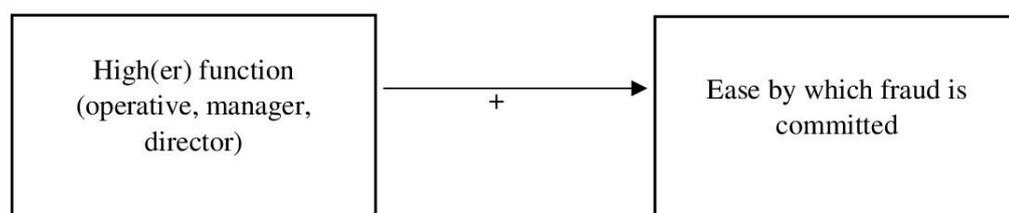
increases their ability to spot gaps in these controls (ACFE, 2014; ACFE, 2020). Over time, they are also able to learn ‘the ropes’ from others in the organization who have successfully committed fraud (ACFE, 2020). Furthermore, employees with a tenure of fewer than ten years are highly susceptible to changes in the organizational environment and spend more time making sense of their surroundings (Hameed et al., 2013). Employees who have been longer employed are already used to the work setting, will have more time that they can invest into understanding and searching potential weaknesses in the controls, have more information (e.g. about financial systems) and thus know better where to look for opportunities (Fathi et al., 2017; Daigle et al., 2009; Gagliardi, 2014; Farr & Ringseis, 2002; Hameed et al., 2013; ACFE, 2014; ACFE, 2020). Subsequently, they can use this knowledge for manipulation. This reduces their risk of getting caught and means that they also need less effort to conceal the fraud (*trait 3*).

In the light of all the previous theoretical insights, this study expects that higher positioned employees (i.e. employees with a high(er) function or long(er) tenure) can more easily commit fraud because they have access to more opportunities and are more likely have the necessary capabilities to exploit these. This could be an indication for an increased likelihood for high positioned employees to rationalize their decision to commit fraud because ‘it is easy’.

Firstly, it is hypothesized that:

H1: Employees with a high(er) function can more easily commit fraud than employees with a low(er) function

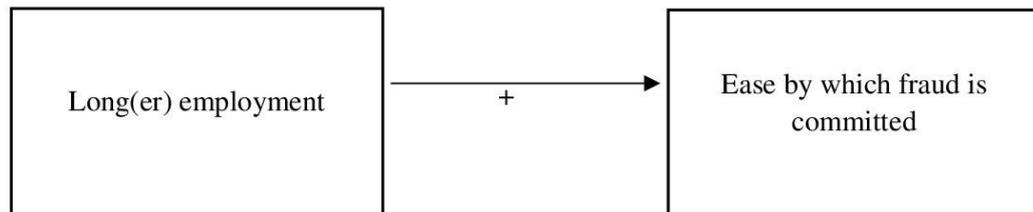
Figure 1. *The hypothesized direct effect between an employee’s function and the ease by which fraud is committed.*



Secondly, it is hypothesized that:

H2: Employees who are long(er) employed can more easily commit fraud than employees who are less long employed

Figure 2. *The hypothesized direct effect between the length of employment and the ease by which fraud is committed.*



2.5 Age; a moderating factor for 'the ease'

Research indicates that fraudsters are more likely to be older and that median losses increase with age (Mackevicius & Giriunas, 2013; Holtfreter, 2005; ACFE, 2020). Although age seems a relevant factor in employee fraud, Mackevicius & Giriunas (2013) stated that scientific research into fraud motivations by age has not been done yet.

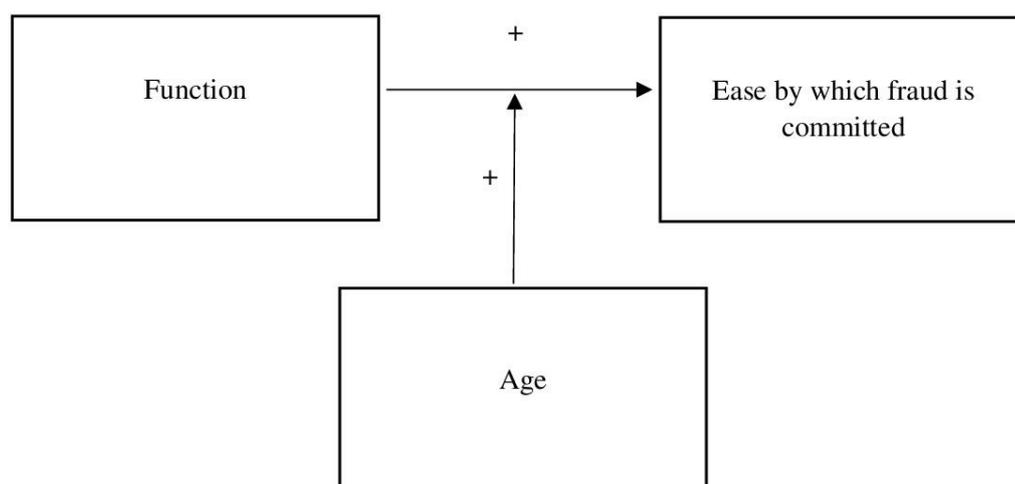
In essence, tenure and a high-level function overlap with chronological age. Tugan (2012) for example shows that older people are more likely to be in a higher-ranked position. However, younger employees increasingly occupy management functions. There is a strong tendency for organizations to attract, employ, and retain young professionals ('the millennials') as management trainees because they show great potential as new 'future leaders' (Belcher, 2015; Deloitte, 2017; Hamori et al., 2015). The US Bureau of Labor Statistics (2020) confirms that employees occupying high(er) and authoritative functions are not necessarily 'old' (e.g. >55 years); of a sample of 147795 employees, 18230 persons between 20 and 34 are occupying an authoritative function (e.g. as managers or directors), whilst 15346 are between 35 and 44, 14049 between 45 and 54, and 15637 are older than 55 years. And with respect to tenure: inevitably, an employee with a long(er) tenure is probably also old(er), but; when a chronological older employee joins an organization, his organizational age (tenure) will be short.

So, it is important to examine age as a moderating factor because an increase in age can strengthen the relationship between function level or the length of employment and 'the ease'. Mackevicius and Giriunas (2013) indicate that younger employees have fewer

responsibilities than older workers, which could mean that they are not evenly exposed to opportunities as older workers. Young employees are also more often monitored by supervisors and want to build and keep a good relationship with them because most want to advance in their careers (Fathi et al., 2017; Mackevicius & Giriunas, 2013). Moreover, it can be assumed that, for example, older employees are more likely to have had an authoritative function in the past, or a long tenure with another organization. This then to some extent junctions with the previous arguments in section 2.4; from their previous work, educational, and life experiences, the older worker might have obtained the necessary fraud skills and capabilities. Giniger et al. already recognized in 1983 that older workers can outdo younger workers in terms of performance in both speed and skilled jobs, mostly due to their (previous (work)) experience. Furthermore, Li et al. (2013) indicate that older people, who have gone through a lifetime of decision making, tend to have greater patience, better financial understanding, and have acquired relatively more experience and accumulated knowledge. When employees occupy an operative function, or their tenure is short, but they are relatively old, it could still strengthen their easiness. Moreover, if an employee, relating to the previous two hypotheses, would occupy a high(er) function or has a long(er) tenure but is also (significantly) older (e.g. >56 years), their initial increase in ‘the ease’ is expected to be even stronger. Therefore, the current study hypothesizes that:

H3: The relationship between an employee’s function and the ease by which fraud is committed is stronger for older employees

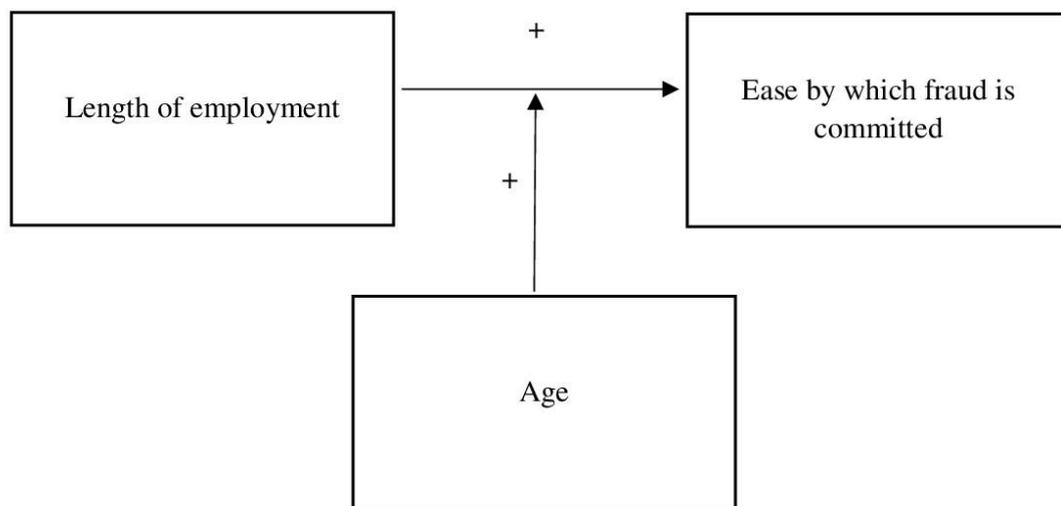
Figure 3. *The hypothesized direct effect between an employee’s function and the ease by which fraud is committed and possible moderator age.*



Furthermore, this current study hypothesizes that:

H4: The relationship between an employee's length of employment and the ease by which fraud is committed is stronger for older employees

Figure 4. *The hypothesized direct effect between the length of employment and the ease by which fraud is committed and possible moderator age.*



3. DATA AND METHODS

The information in this chapter has been partly obtained through various conversations with Hoffmann's private detectives.

Hoffmann is a private (cyber)security and investigation organization that consists of consultants, IT specialists, (behavioural) researchers, and private (digital) detectives (Hoffmann, 2021). It is one of the few experienced Dutch organizations with a lot of in-house expertise that does investigative research into fraudulent behaviour. Appendix A provides additional information about Hoffmann, specific certifications, and the private detective's training and methods.

3.1 Hoffmann's administrative form

This study uses Hoffmann's administrative form as dataset. Hoffmann's certified private detectives investigate fraud cases in the organizations of their clients. After an investigation, the private detectives fill in the administrative form about the specific fraud case based on their investigation and the contents of the investigation's report. The information in the administrative form is anonymized to protect the privacy of the fraudsters and detectives. A translated description of the form and the corresponding variables and answer categories is added in appendix B. 450 fraud cases are included in this study from 2015 to 2020.

The detectives mostly work in pairs to combine their qualities and increase the accuracy and efficiency of the investigation. The majority of the assignments are long trajectories (e.g. several months) that need extensive research into the organization and the (potential) fraudster. This could be because of contradictory statements that require relatively more research to uncover the truth. During the investigation, the detectives write up a report that consists of notes, findings, and evidence from the used methods. The methods of investigation depend on the given assignment, the client's budget, the type of fraud, and the actors involved. To gather information about the (potential) fraudster and the fraudulent act, detectives can do informative research by going through administrative (e.g. accountancy) files, search in public sources, do digital research (e.g. if they have legal interest, they can browse through business phones or emails), do forensic research and observations (e.g. place or check CCTV cameras), or talk with (involved) colleagues to find out more about the fraudster's background and rationale. In most cases, the findings from these methods are discussed with the concerned person via interviews. In these conversations some confess immediately, and others keep quiet. If they keep quiet the detectives focus more on other, previously mentioned, sources of information and the communication around it to come to conclusions.

3.2 Data quality implications

Hoffmann and their dataset are in a unique position on the current market of private (cyber)security and investigations agencies (elaborated on in Appendix A). This makes the data in any case special; they have a lot of in-house expertise and are less bound by compliancy rules to conduct research than accountancy firms. As mentioned earlier, the data can shed some light on the dark figure of fraud and incorporates interviews with actual fraudsters. Furthermore, the different methods described in the previous section have been improved and adapted over the years to stay efficient, discrete, and confidential. The use of more than one method to collect data is called triangulation; the main goal of triangulation is to inhibit biases and improve the reliability and validity of the data (Jonsen & Jehn, 2009). The combination of triangulation, experienced private detectives who work together, and extensive research spanning over long trajectories improves the overall quality of the data.

However, this should be nuanced. One could argue that the methods could, to some extent, be considered valid and reliable for variables that are based on facts (e.g. company size, type of organization, age, function, length of employment, gender), which cannot be interpreted differently. This is because these variables have high content validity; it is easy to cover all

aspects of the variable because there is just one. But it must be noted that the methods of the private detectives to collect data are considerably different from the methods used by social science researchers. Social science researchers are trained to collect data in a standardized way and grant explicit thoughts to data's reliability, validity, and representativeness (Morling et al., 2018). The detective's work from a different perspective; their priority is to do investigative research and fulfil the client's needs. Thus, they are not focused on standardized data collection and assuring its quality. This brings some limitations when using Hoffmann's dataset for scientific research.

Even though the detectives follow (basic) procedures, the research conditions are not standardized. Methods differ per detective, fraud case, and corresponding (organizational) circumstances and thus are not applied consistently (under the same conditions) for every fraud investigation. This could be an indication of low test-retest reliability (the consistency of measures across time) and low inter-rater reliability (the consistency of measures across observers) (Morling et al., 2018). It poses a threat to the extent to which the same findings can be reproduced if the investigation were to be repeated. This specifically holds for assessing the fraudster's motivations (e.g. 'it was easy'). If contradictory or mixed findings and statements about the fraudster's incentives are present, the private detectives make a judgement call based on their professional opinion. Even though they are trained and experienced, this is still subjective and inhibits the reliability of the data across time and different detectives. The latter can arise due to observer bias; filling in the subjective parts of the form requires personal judgement, thus can be assessed differently by different detectives (Hróbjartsson et al., 2012). Hoffmann's methods are thus not specifically designed to measure these variables, which inevitably threatens the validity (or accuracy), the extent to which the methods measure what they were supposed to measure. More specifically, it is a threat to internal validity; it inhibits the trustworthiness of the measurements not being influenced by other factors (the detectives) (Morling et al., 2018). It is also a threat to the external validity, the generalizability of the results. Social researchers would use sampling methods to find a group of respondents representing the defined population (Morling et al., 2018). However, Hoffmann works for clients and thus cannot choose whom to investigate. Moreover, the sample's representativeness is inhibited because the form has relatively much missing data (see table 1). Again, this is because their priority is not to collect data but to investigate for their clients. As a result, not all the variables are filled in because they are not relevant for every investigation. To keep a sufficient sample size, the focus lies on relatively better represented variables. Specifically: ease (0 missings), age (39 missings), function (37

missings), the length of employment (63 missings), and (control variable) gender (0 missings). Other variables that could be used as control variables (e.g. education or key carrier) have relatively many missings. To prevent limiting the fraud cases to a minimum, only ‘gender’ will be used as a control variable.

Table 1. Valid N and missing values of all variables in the dataset.

	Valid N	Missings
Company size	489	14
Type of organization	494	9
Gender	503	0
Status partner	206	297
Key carrier	254	249
Age	464	39
Function	466	37
Image	217	286
Educational level	188	315
Partner informed	133	370
Type of irregularity	334	169
Sanction	284	219
Length of employment	454	63
Screened	68	435
Specified reason		
<i>Financial</i>	503	0
<i>Ease</i>	503	0
<i>Frustration</i>	503	0
<i>Tension</i>	503	0
<i>Blackmail</i>	503	0

3.3 Operationalization of the variables

3.3.1 Dependent variable

The dependent variable is the dichotomous, nominal variable ‘*the ease by which fraud is committed*’, also referred to as ‘the ease’. The following variable from Hoffmann’s dataset is used: ‘*it was easy*’. The detectives make a binary choice by checking the box ‘it was easy’ or not checking the box ‘it was easy’, as one of the underlying reasons for why the fraudster committed fraud. This variable falls under the header of effort; did the fraudster needed to put

in a lot of effort or was it easy for them? According to the private detectives, this depends on the presence of opportunities and the fraudsters capabilities to exploit these.

Information about the ease is gathered through conversations with the fraudster in combination with the examination of the organizational context. So, firstly, as procedure, the detectives simply ask the fraudsters: “Why did you do this?” or “Was it easy for you?”. Respectively, the fraudster can answer: “Because it was easy” or “Yes, it was easy” and explain why this was the case. Secondly, as procedure, the detectives examine the internal control mechanisms and security procedures within their client's organization to search for possible weaknesses. By doing this, they can investigate whether there were opportunities for the fraudster that made it easy for them to commit the fraudulent act and assess whether they had the capabilities to exploit these. The detectives ask themselves: “How would I do it if I were this person?” or “How would I get around the internal control mechanisms and security procedures?”, and subsequently determine if it was easy for the specific fraudster to commit fraud. The variable is coded as a 0,1-dummy variable with 0: ‘*it was not easy*’ and 1: ‘*it was easy*’.

3.3.2 Independent-, moderator-, and control variable(s)

The information to measure the variables in the following sections is gathered by the private detectives using the methods described in section 3.1. Three examples will be given, which will not be repeated for every variable. Firstly, the required information can come from the interviews (e.g. by asking “What is your function?”). Secondly, it can be given by the fraudster’s organization or employer. Thirdly, they can have obtained the information through open sources (e.g. LinkedIn, Facebook).

Independent variables

This study has two independent variables, namely ‘*function*’ and ‘*length of employment*’.

For the ordinal variable *function*, ‘*function description*’ is used. The private detectives fill in ‘operatives’, ‘management’, or ‘directors’. The variable is recoded from low- to high job-level, i.e. (1) ‘*operative*’, (2) ‘*manager*’, (3) ‘*director*’.

For the second independent variable, the ratio variable ‘*length of employment*’ is used. In the administrative form, the fraudsters are placed in 11 different groups: <1, 1, 2, 3, 4, 5, 6-10, 11-20, 21-30, 31-35 or > 36 years of employment. The variable is recoded into three length of employment categories. Specifically, (1) ‘*short-term: 0 to 10 years*’, (2) ‘*medium-term: 11 to 20 years*’, and (3) ‘*long-term: >21 years*’.

Moderator variable

For the ordinal moderation variable ‘age’, ‘age indication’ is used. In the administrative form, the fraudsters are placed in one of six different age categories: 18-25, 26-35, 36-45, 46-55, 56-60, or 60+ years of age. The variable is recoded into three different age categories. Specifically, ‘young: 18 to 35 years old’, ‘middle-aged: 36 to 55 years old’ and ‘old: >56 years old’. Interaction terms are created with ‘age*function’ and ‘age*length of employment’.

Function, the length of employment, and age can be treated as continuous for a sensitivity analysis (e.g. lowest to highest function: 1, 2, 3) or as categorical by making 0,1-dummies, where the first categories are set as the reference category (RC).

Control variable

The dichotomous, nominal variable ‘gender’ controls whether the (possible) effects are not influenced by gender. Research shows that men offend at (much) higher rates than women in all crime categories, except prostitution (Schwartz & Steffensmeier, 2007). ACFE (2020) shows that male (72%) fraudsters outnumber females (28%). Hoffmann’s dataset also shows that twice as many males (N=300 or 66.7%) are fraudsters compared to women (N=150 or 33.3%). Additionally, research indicates that more men claim positions of authority within organizations than women (Tugas, 2012). These positions can provide them with more assets and opportunities to commit fraud. Gender could thus influence the outcomes. The private detectives fill in ‘male’ or ‘female’, which is recoded as a 0,1-dummy variable with 0: ‘male’ and 1: ‘female’.

3.4 Analytical strategy

3.4.1 Binary logistic regression analysis

Binary logistic regression (BLR) analyses are performed in the statistical program ‘SPSS Statistics 26’. This is used because the dependent variable ‘the ease’ is binary (Field, 2009). A linear regression cannot be performed because the outcome variable is not continuous and thus the assumption of linearity is violated. The BLR predicts the probability of the outcome of the binary dependent variable by calculating odds ratios. It uses the natural logarithm of those odds (log-odds) as a regression function of the predicting variables (LaValley, 2008).

3.4.2 Models of analysis

There are six categorical models (model 1-6) that all perform a multiple binary logistic regression (MBLR).

Model 1 tests the possible relationship between the different functions (RC=operative) and

‘the ease’. Model 2 controls this for gender (RC=male). This model tests H1.

Model 3 tests the possible relationship between the different length of employment categories (RC=short-term) and ‘the ease’. Model 4 controls this for gender (RC=male). This model tests H2.

Model 5 tests whether the relationship between the different functions (RC=operative) and ‘the ease’ is moderated by different age groups (RC=young), and controls for gender (RC=male). It includes four interaction terms: *middle-aged*manager*, *old*manager*, *middle-aged*director*, *old*director*. This model tests H3.

Model 6 tests whether the relationship between the different length of employment categories (RC=short-term) and ‘the ease’ is moderated by different age groups (RC=young), and controls for gender (RC=male). It includes four interaction terms: *middle-aged*medium-term*, *middle-aged*long-term*, *old*medium-term*, *old*long-term*. This model tests H4.

In appendix D, a sensitivity analysis is done with six continuous models (model 7-12) to assess if the explanatory variables are sensitive to how they are treated.

3.4.3 Assumptions

Prior to the interpretation of the results, the assumptions of a binary logistic regression are evaluated. Namely, assumption (1) the presence of a binary dependent variable, (2) the independence of observations, (3) the absence of multicollinearity, (4) the absence of outliers in the continuous predictors, (5) the continuous independent variables are linearly related to the log odds, and (6) the sample size is sufficient (Agresti, 2018; NCRM, 2021). Assumption (1) is met; ‘it was easy’ is binary. Assumption (2) is also met; all observations are individual fraud cases that do not originate from repeated measurements or matched data. Assumption (3) is met; all VIF (Variance Inflation Factor) scores are below 10 and the tolerance is not below .10 (see table 2 below). Moreover, the correlation table (see table 3 below) indicates that none of the variables are highly correlated with each other; all Pearson correlation values are below 0.5 and there are no values close to 1. Assumption (4) and (5) are also met; the models only include categorical and not continuous variables. Assumption (6) is met; the sample size is large enough (N=450). For each independent variable, the least frequent outcome is >10. Furthermore, the cell count is checked by examining a crosstabulation table in SPSS. The cell counts are sufficient, and thus the categories can be used. However, if more and smaller categories (e.g. 0 to 5 years of employment) would have been used, it would not have been sufficient. Furthermore, by examining the Hosmer and Lemeshow test, when

adding all variables, it shows that the model fits the data, because the test is not statistically significant ($p=.670$).

Table 2. Tolerance and VIF scores: categorical variables.

Variable	Tolerance	VIF
Function (RC: operative)		
<i>Manager</i>	.915	1.092
<i>Director</i>	.950	1.053
Length of employment (RC: short term)		
<i>Medium-term</i>	.906	1.104
<i>Long-term</i>	.840	1.191
Age (RC: young)		
<i>Middle-aged</i>	.678	1.474
<i>Old</i>	.634	1.578
Gender (RC: male)	.919	1.088

Note: RC = reference category

Table 3. *Pearson correlation table: categorical variables.*

	'The ease'	Operative	Manager	Director	Short-term	Medium-term	Long-term	Young	Middle-aged	Old	Gender
'The ease'	1	-.048	.033	.034	-.141**	.116*	.056	-.020	-.041	.075	-.059
Operative	-.048	1	-.433**	-.471**	.041	.057	-.124**	.168**	-.101*	-.066	-.242**
Manager	.033	-.433**	1	-.095*	-.063	-.033	.126**	-.124**	.077	.047	-.197**
Director	.034	-.471**	-.095*	1	.026	-.049	.023	-.104*	.060	.044	-.121*
Short-term	-.141**	.041	-.063	.026	1	-.407**	-.488**	.397**	-.120*	-.309**	.046
Medium-term	.116*	.057	-.033	-.049	-.407**	1	-.213**	-.243**	.192**	.037	.027
Long-term	.056	-.124**	.126**	.023	-.488**	-.213**	1	-.259**	-.063	.382**	-.095*
Young	-.020	.168**	-.124**	-.104*	.397**	-.243**	-.259**	1	-.470**	-.307**	.086
Middle-aged	-.041	-.101*	.077	.060	-.120*	.192**	-.063	-.470**	1	-.498**	.035
Old	.075	-.066	.047	.044	-.309**	.037	.382**	-.307**	-.498**	1	-.145**
Gender	-.059	.242**	-.197**	-.121*	.046	.027	-.095*	.086	.035	-.145**	1

*Notes: N=450; *p<.05, **p<.01, ***p<.001; two-sided test with Pearson's correlation coefficient. The ease = the ease by which fraud is committed.*

4. RESULTS

4.1 Descriptive statistics

Table 4. Univariate analysis: descriptive statistics of dependent-, independent-, moderation-, and control variable(s).

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>S.D.</i>
<i>Ease by which fraud is</i>					
<i>committed</i> (0 = it was not easy, 1 = it was easy).	450	0	1	.242	
<i>Function</i> (1 = operative, 2 = manager, 3 = director)	450	1	3	1.25	.537
<i>Operative</i>	450	0	1	.804	
<i>Manager</i>	450	0	1	.144	
<i>Director</i>	450	0	1	.051	
<i>Length of employment</i> (1 = short-term, 2 = medium-term, 3 = long-term)					
<i>Short-term</i>	450	0	1	.642	
<i>Medium-term</i>	450	0	1	.218	
<i>Long-term</i>	450	0	1	.14	
<i>Age</i> (1 = young, 2 = middle-aged, 3 = old)					
<i>Young</i>	450	0	1	.291	
<i>Middle-aged</i>	450	0	1	.522	
<i>Old</i>	450	0	1	.187	
<i>Gender</i> (male = 0, female = 1)					
	450	0	1	.333	

Note: the table includes the minimum (*min.*) and the maximum (*max.*) values as well as the mean and the standard deviation (*S.D.*). For all (0,1-dummy) categories: 0 = not, 1 = yes. E.g., operative: 0 = not an operative, 1 = operative.

From table 4 it can be derived that in 24.2% of the fraud cases it was assessed to be easy, while in 75.8% this was not the case. Furthermore, 80.4% of fraudsters are operatives, 14.4% are managers, and 5.1% are directors. Moreover, 64.2% of the fraudsters are in the short-term length of employment category (0-10), 21.8% are in the medium-term category (11-20), and 14% are in the long-term category (>21). Next to that, 29.1% of the fraudsters are young (18-35), 52.2% are middle-aged (36-55), and 18.7% are old (>56) and there are twice as many males as fraudsters (66.7%), compared to females (33.3%).

To answer the first descriptive question, table 5 (below) shows the frequencies of all variables and gives a more elaborate picture of the characteristics of the fraudsters. In Appendix C, the current sample of this study (450 fraudsters) is compared to the descriptive statistics of the full sample (503 fraudsters) to examine if there are substantial differences. The comparison indicates that the fraudsters in the used sample represent the fraudsters in the full sample. It can thus be assumed that the frequencies described below, based on 450 fraudsters, correspond with the frequencies based on 503 fraudsters. As previously indicated, most other variables have relatively many missing values. Therefore, the percentages (rounded to 1 decimal) in table 5 are based on the valid cases of the variable or category divided by the study's sample (450). The variables that are not self-explanatory are explained in the notes below the table.

Table 5. Frequencies of all variables, with percentage of missing values of 450, valid N, and the valid N percentage of 450.

	Percentage missings of 450	Frequency (valid N)	Percentage of 450
Function	0	450	100
<i>Operative</i>		362	80.4
<i>Manager</i>		65	14.4
<i>Director</i>		23	5.1
Length of employment	0	450	100
<i>Short-term (0-10 years)</i>		289	64.2
<i>Medium-term (11-20 years)</i>		98	21.8
<i>Long-term (>21 years)</i>		63	14
Age	0	450	100
<i>Young (18-35 years old)</i>		131	29.1
<i>Middle-aged (36-55 years old)</i>		235	52.2
<i>Old (>56 years old)</i>		84	18.7
Gender	0	450	100
<i>Male</i>		300	66.7
<i>Female</i>		150	33.3
Company size	2.7	438	97.3
<i>>20</i>		39	8.7
<i>20-50</i>		51	11.3
<i>50-100</i>		71	15.8
<i>>100</i>		277	61.6
Type of organization	1.6	443	98.4
<i>Production</i>		71	15.8
<i>Service extension</i>		67	14.9
<i>Healthcare institutions</i>		114	25.3
<i>Educational institutions</i>		23	5.1
<i>Wholesale and retail trade</i>		43	9.6

Table 5. Continued.

	Percentage missings of 450	Frequency (valid N)	Percentage of 450
<i>(Semi)government institutions</i>		51	11.3
<i>Trading companies</i>		15	3.3
<i>Industry</i>		20	4.4
<i>Attorney's office</i>		3	.7
<i>Other</i>		36	8.0
Status partner (as in spouse)	58.2	188	41.8
<i>No partner</i>		42	9.3
<i>Partner</i>		146	32.4
Key carrier	47.8	235	52.2
<i>Not a key carrier</i>		76	16.9
<i>Key carrier</i>		159	35.3
Image	55.3	201	44.7
<i>Negative</i>		64	14.2
<i>Positive</i>		137	30.4
Educational level	60.7	177	39.3
<i>LO (primary education)</i>		25	5.6
<i>MO (secondary education)</i>		34	7.6
<i>MBO (secondary vocational education)</i>		79	17.6
<i>HBO (higher vocational education)</i>		34	7.6
<i>University</i>		5	1.1
Partner informed	72.9	122	27.1
<i>Not informed</i>		81	18
<i>Informed</i>		41	9.1
Type of irregularity	32.2	305	67.8
<i>Money</i>		126	28
<i>Goods</i>		84	18.7

Table 5. Continued.

	Percentage missings of 450	Frequency (valid N)	Percentage of 450
<i>Addiction (e.g. stealing medicine)</i>		15	3.3
<i>Data</i>		23	5.1
<i>Time (e.g. time sheet or time card fraud)</i>		12	2.7
<i>Break of contract</i>		3	.7
<i>Other</i>		42	9.3
Sanction	42	262	58
<i>Dismissal</i>		167	37.1
<i>Settlement agreement</i>		11	2.4
<i>Warning</i>		2	.4
<i>Fine</i>		5	1.1
<i>Mutually aranged</i>		2	.4
<i>No sanction</i>		6	1.3
<i>Other</i>		69	15.3
Screened (before hiring)	86	63	14
<i>Not screened</i>		57	12.7
<i>Screened</i>		6	1.3
<u>Specified reason</u>		3	.7
<i>Financial</i>	0	450	100
<i>No</i>		348	77.3
<i>Yes</i>		102	22.7
<i>Easy</i>	0	450	100
<i>No</i>		341	75.8
<i>Yes</i>		109	24.2
<i>Frustration</i>	0	450	100
<i>No</i>		425	94.4
<i>Yes</i>		25	5.6

Table 5. *Continued.*

	Percentage missings of 450	Frequency (valid N)	Percentage of 450
Tension	0	450	100
<i>No</i>		441	98
<i>Yes</i>		9	2
Blackmail	0	450	100
<i>No</i>		446	99.1
<i>Yes</i>		4	.9

Notes on how to interpret the variables in the table that are not obvious: **Function**; *the operatives* are 'basic' employees that are responsible for the organization's day to day operations. *The managers* often lead projects, have some independent decision-making power, direct the operatives, and report the organizational progress to the directors. *The directors* (e.g. CEO or CFO) are the supervisors of the organization that hold the highest function and have the most authority. **Key carrier**; an employee who can independently gain access to, for example, the business premises. Being a key carrier could indicate that the employee gained a certain level of trust in the organization. A fraudster's **image** in the organization is assessed based on conversations with colleagues or the fraudster's superiors. **Type of irregularity**; the type of fraud or what exactly was fraudulent or being frauded with in that specific case (e.g. money, goods). **Specified reason**; *Financial*: fraudsters who are motivated by the financial gain, for example they are seeking money to solve personal financial problems. *Frustration*: these are fraudsters motivated by frustration, for example because they missed a career opportunity or watched others receive promotion. *Tension*: these fraudsters are motivated because they are seeking for thrill, types that like to walk just outside the lines and push the boundaries. *Blackmail*: were blackmailed into committing fraud. **Other institutions/irregularities/sanctions**; here an open field is filled in by the private detectives. However, the given data set does not provide the information that is described in these fields.

Some interesting insights from table 5, based on the available information, will be summarized here. 61.6% (N=277) of the fraudsters are in a company that has >100 employees. Most fraudsters work in a healthcare institution (25.3%, N=114) and did secondary (vocational) education (MO&MBO; 25.2%, N=113). 32.4% (N=146) of fraudsters have a partner (as in spouse) of which only 9.1% (N=41) is informed of the fraudulent act. 35.3% (N=159) of the fraudsters are key carriers, only 1.3% (N=6) are screened, and 30.4% (N=137) have a positive image in the organization. Most often the fraudulent acts were

related to money (28%, N=126) and fraudsters were sanctioned with dismissal (37.1%, N=167). The most common motivation for fraudsters is that it was easy (24.2%, N=109), followed by financial motivations (22.7%, N=102). Frustration (5.6%, N=25), tension (2%, N=9), and blackmail (.9%, N=4) were not common motivators for fraudsters.

4.2 Binary logistic regression tables

The BLR tables include the odds ratios (Exp (B), named OR), and the significance of each predictor variable (* $p < .05$, ** $p < .01$, *** $p < .001$). The Exp (B) is the exponent of the B-coefficient that is used to indicate how much change in the outcome variable each change in the explanatory variable will predict. For the categorical predictors, the odds ratio for a specific predictor relates to a comparison with the reference category. The confidence interval (CI) indicates that it is 95% confident that the true value for the odds ratio lies within the ranges of the lower and upper limit. Furthermore, the Nagelkerke pseudo- R^2 is included. Pseudo- R^2 -statistics solely give an approximate indication of the variance in the dependent variable that is explained by the independent variable(s), compared to R^2 -statistics in linear regressions (IBM Knowledge Center, n. d.). The interpretation of the pseudo- R^2 -statistic should therefore be done with caution. The omnibus test of model coefficients (Chi^2 , named χ^2) is also indicated to show whether the model improves on the null (or baseline) model and thus whether it is better at predicting the outcome; it tests if there is a significant difference between the levels of -2 Log likelihood (NCRM, 2021). In-text, the overall effect of each independent variable is indicated with the use of the Wald statistics.

4.3 Function

Table 6. Multiple binary logistic regression analyses for variables predicting the ease by which fraud is committed.

	Model 1		Model 2	
	OR	95% CI	OR	95% CI
Constant	.302***		.333***	
Function (RC: operative)				
Manager	1.267	[.699, 2.299]	1.182	[.643, 2.174]
Director	1.448	[.576, 3.637]	1.344	[.529, 3.412]
Gender (RC: male)				
			.774	[.476, 1.258]
Nagelkerke pseudo-R ²	.004		.007	
-2 Log likelihood	497.186		496.100	
χ^2	1.079		2.165	

Notes: dependent variable = the ease by which fraud is committed. N = 450, *p<.05, **p<.01, ***p<.001. RC = reference category.

The findings of model 2, in table 6, are in line with model 1. Thus, only model 2 will be interpreted to test H1. The overall model explains 0.7% of the variance and the omnibus test of model coefficients is not significant ($\chi^2=2.165$, p=.539). Gender also proves to be non-significant (OR=.774, p=.301). No overall effect was found (Wald=.598, p=.742).

Furthermore, a positive but not significant effect was found when comparing managers to operatives (OR=1.182, p=.590) and comparing directors to operatives (OR=1.344, p=.534). The results remained non-significant when changing the reference category to manager or director. The findings from the sensitivity analysis in Appendix D, where function is treated as continuous, are in line with these findings; no significant effects were found here either.

The odds ratios are positive as expected, but none of them are significant. Thus, these results indicate that hypothesis 1 cannot be confirmed and must be rejected; there is no relationship between an employee's high(er) function and the ease by which fraud is committed.

4.4 Length of employment

Table 7. Multiple binary logistic regression analyses for variables predicting the ease by which fraud is committed.

Variable	Model 3		Model 4	
	OR	95% CI	OR	95% CI
Constant	.246***		.270***	
Length of employment (RC: short-term)				
medium-term	2.066**	[1.242, 3.439]	2.076**	[1.246, 3.459]
long-term	1.758	[.954, 3.238]	1.699	[.920, 3.141]
Gender (RC: male)				
			.752	[.466, 1.212]
Nagelkerke pseudo-R ²	.029		.034	
-2 Log likelihood	489.352		487.958	
χ^2	8.913*		10.307*	

Notes: dependent variable = the ease by which fraud is committed. N=450, *p<.05, **p<.01, ***p<.001. RC = reference category.

The findings of model 4, in table 7, are in line with the findings of model 3. Thus, only model 4 will be interpreted to test H2. The overall model explains 3.4% of the variance and the omnibus test of model coefficients is significant ($\chi^2=10.307$, $p<.05$), suggesting that the model is better at predicting the outcome. The overall effect is significant (Wald=8.827, $p<.05$). The control variable gender is not significant (OR=.752, $p=.243$). Furthermore, the findings for employees that are employed for >21 years (category ‘long-term’) are positive but not significant (OR=1.699, $p=.091$). It remained non-significant when changing the reference category to medium-term or long-term. Only the medium-term group of employees prove to be positive and significant (OR=2.076; 95% CI=1.246, 3.459; $p<.01$). This indicates that employees with a length of employment of 11 to 20 years are approximately 2 (2.076) times more likely to be in the group of fraudsters for whom it was assessed to be easy, compared to the short-term employed (i.e. for 0 to 10 years).

In table 15, model 10, in appendix D, the length of employment is included as a continuous variable. The findings indicate a significant and positive direct effect of length of employment on ‘the ease’ (OR=1.417; 95% CI=1.068, 1.880; $p<.05$). This means that if the fraudster moves to the subsequent length of employment category, there is an approximate predicted 41.7% (1.417) increase in the odds that the fraud will be assessed to be easy. From

short-term to long-term (>21 years) the increase in the odds is $1.417 * 1.417 = 2.008$ (100,8%).

These findings demonstrate that the results are sensitive to how these variables are treated. More specifically, the results from the continuous models indicate that there is a linear relationship between the length of employment and 'the ease'. Thus, this evidence supports the hypothesis that employees with a longer tenure can more easily commit fraud. However, the evidence from the categorical model makes this finding less robust. Even though the categorical model finds an overall effect, it suggests that the relationship is non-linear; the long-term category does not significantly differ from the short-term category. This indicates that there might be a threshold to the linear relationship in the continuous model. Thus, the relationship might not be so straightforward and should be more nuanced. These findings indicate that there is partial support for hypothesis 2.

4.5 Moderator age

Table 8. Multiple binary logistic regression analyses for variables predicting the ease by which fraud is committed with the interaction term age.

	Model 5		Model 6	
	OR	95% CI	OR	95% CI
Constant	.366***		.330***	
Function (RC: operative)				
Manager	.337	[.041, 2.796]		
Director	2.977	[.179, 49.493]		
Length of employment (RC: short-term)				
Medium-term			1.082	[.206, 5.684]
Long-term			.990	[.173, 2.751]
Age (RC: young)				
Middle-aged	.839	[.480, 1.464]	.595	[.317, 1.117]
Old	1.350	[.676, 2.693]	1.273	[.503, 3.223]
Gender (RC: male)				
	.809	[.494, 1.325]	.745	[.458, 1.212]
Interaction term age * function (RC: young & executor)				
Middle-aged * manager	4.627	[.490, 43.664]		
Old * manager	3.314	[.292, 37.596]		
Middle-aged * director	.446	[.021, 9.417]		
Old * director	.370	[.013, 10.277]		
Interaction term age * length of employment (RC: young & short-term)				
Middle-aged * medium-term			2.627	[.436, 15.834]
Old * medium term			2.665	[.634, 11.197]
Middle-aged * long-term			1.468	[.188, 11.440]
Old * long-term			.925	[.784, 1.092]
Nagelkerke pseudo-R ²	.023		.048	
-2 Log likelihood	491.429		483.522	
χ^2	6.836		14.743	

Notes: dependent variable = the ease by which fraud is committed. N=450, * $p < .05$, ** $p < .01$, *** $p < .001$. RC = reference category.

Model 5, in table 8, is used to test H3. The overall model explains 2.3% of the variance and the omnibus test of model coefficients is not statistically significant ($\chi^2=6.836$, $p=.468$). None of the variables in this model have a significant effect on ‘the ease’. The overall effect is not significant (Wald=2.235, $p=.693$). The interaction terms between the different function- and

age categories are also not significant; *middle-aged*manager* (OR=4.627, p=.181), *old*manager* (OR=3.314, p=.334), *middle-aged*director* (OR=.446, p=.603), and *old*director* (OR=.370, p=.558). The findings from the sensitivity analysis in Appendix D, where both age and function are treated as continuous, are in line with these results and show no significant effects.

These findings indicate that hypothesis 3 cannot be confirmed and must be rejected. Thus, the relationship between function and the ease by which fraud is committed is not moderated by age and thus not stronger for older employees.

Model 6, in table 8, is used to test H4. The overall model explains 4.8% of the variance and the omnibus test of model coefficients not significant ($\chi^2=14.743$, p=.064). None of the variables in this model have a significant effect on ‘the ease’. The overall effect is not significant (Wald=2.691, p=.442). The interaction terms between the different length of employment- and age categories are also not significant; *middle-aged*medium-term* (OR=2.627, p=.292), *old*medium-term* (OR=2.665, p=.181), *middle-aged*long-term* (OR=1.468, p=.714), and *old*long-term* (OR=.925, p=.359). The findings from the sensitivity analysis in Appendix D, where both age and the length of employment are treated as continuous, are in line with these results and show no significant effects.

These findings indicate that hypothesis 4 cannot be confirmed and must be rejected. Thus, the relationship between the length of employment and the ease by which fraud is committed is not moderated by age and thus not stronger for older employees.

The interaction terms in model 5 and 6 remained non-significant when changing the reference categories. In Appendix E, it is also tested whether age (categorical or continuous) directly affects ‘the ease’; these results are also non-significant.

5. DISCUSSION, OVERALL CONCLUSION, AND POLICY ADVICE

The study expected that an employee’s high(er) function or long(er) employment has a positive effect on the ease by which fraud is committed, and that these effects are stronger for older employees. The theoretical expectations were deduced from ‘The New Fraud Triangle Model’ (Kassem & Higson, 2012), and other relevant scientific research. To test these expectations, data was analyzed from the private security firm Hoffmann by using binary logistic regression models. The data was gathered over the period between 2015 and 2020. 450 fraudsters were included in the study.

5.1 Discussion

5.1.1 Length of employment

This study found significant effects between the relationship of the length of employment and the ease by which fraud is committed. This aligns with the theoretical expectations. There could be two important explanations. Firstly, their long tenure improves their position of trust and (informal) authority, resulting in being less likely to be monitored (Gagliardi, 2014; Daigle et al., 2009; ACFE, 2020). Secondly, due to their position and experience, these employees are more likely to be exposed to opportunities because they can more easily spot internal control weaknesses, weaknesses that they are also more likely to understand and subsequently exploit because they have the necessary capabilities (Fathi et al., 2017; Daigle et al., 2009; Gagliardi, 2014; Wolfe & Hermanson, 2004; AFCE, 2020).

Reflecting on these explanations, it should be recognized that the dependent variable -the ease by which fraud is committed- has multiple outcomes. This originates from a limitation; the data collection was not standardized, which threatens the validity, reliability, and representativeness (see section 3.2). ‘The ease’ is a subjective variable that is susceptible to observer bias. It cannot exactly be assessed due to what ‘the ease’ arises because it measures different kinds of ‘easy’, which varies per fraud case; it is a combination of the fraudster’s opportunities and capabilities based on the detective’s professional opinion and the fraudster’s perceived ease. Future research would benefit from more precisely operationalized variables about ‘the ease’ that adhere to existing theory and knowledge. A recommendation specifically for Hoffmann’s future data collection and the research possibilities using this data is made in Appendix F.

It must be noted that these findings are prone to some nuance. As indicated in the results section (4.4), the categorical model suggests that there is a threshold to the linear relationship found in the continuous model; the long-term employment group (>21 years) does not significantly differ from the short-term employment group (0 to 10 years). Part of the explanation might be the earlier mentioned limitations of the quality of the sample. Another possible explanation is that employees with a tenure of more than 21 years lack the digital technical skills to beat the internal control systems. As Cascio & Montealegre (2016) indicate, technology is rapidly changing the foundations of organizations and how, when, and where we work. Employees with a very long tenure (>21 years) may find it challenging to keep up with all these (technological) changes, to get to know the new systems, and find potential weaknesses inside them. A reason could simply be that these employees are older. Li et al. (2013) indicate that the ability to learn and process new information, or the so-called

‘fluid intelligence’, decreases with age. Furthermore, older workers could be more likely to have reached their career goals and thus try to sustain their position rather than seeking for advancement (CIFAS, 2013). Hence, older workers could be more likely to have withdrawn themselves from the willingness to adapt to organizational changes to advance in their careers. The medium-term employee is more likely to be younger, willing to adapt for career advancement, and has more fluid intelligence. Thus, this might result in them being skilled enough to know how to negotiate the new control systems. Future research is advised to further examine and test the possibility that the decrease of both the ability and the willingness to adapt could explain why the long-term employment group does not significantly differ from the short-term employment group in their ease of committing fraud.

5.1.2 Function

The expectation that employees with a high(er) function have higher ease in committing fraud is not supported by the findings. This contradicts with the theoretical expectations. It was expected that employees in a high(er) function can abuse their position of trust and power to create opportunities and subsequently use their capacity and (intellectual) capabilities to understand and exploit these (Wolfe & Hermanson, 2004; Holtfreter, 2005; Vona, 2012; Suh et al., 2019; Kassem & Higson, 2012).

However, one should interpret these findings with caution. In general, the number of unrevealed fraud cases is higher than those revealed (Mackevicius & Giriunas, 2013; Tunley, 2014). The study’s sample contains 362 fraudulent operatives, 65 managers, and 23 directors. This demonstrates that the operatives are overrepresented, which is the case due to a limitation of this study (as addressed in section 3.2); Hoffmann works for clients and thus cannot search for a scientifically representative group of fraudsters. This overrepresentation would seem to suggest that operatives are more likely to commit fraud. However, it could be that the operatives are just more likely to get caught. There is a good possibility that managers and directors will not be detected at all because their greater access to assets, power, and capabilities put them in a position to manage and override any internal control mechanism (Vona, 2012; ACFE 2014; Suh et al., 2019; Wolfe & Hermanson, 2004). The operatives are not in an authoritative position that grants them these ‘benefits’. Moreover, they are more likely to be closely monitored by their supervisors (i.e. the managers and directors). This brings into mind the classical dilemma: ‘who guards the guardians?’. This question gains extra relevance knowing that median financial loss increases with job level (Carroll, 2015; ACFE, 2020). Future researchers and policy makers are advised to take these

insights into account. The policy advice below addresses a possible solution. If possible, the researchers should seek a representative group of fraudsters with more or less the same number of operatives, managers, and directors.

5.1.3 Age

The results show that age does not moderate the relationship between either an employee's function or the length of employment on the ease by which fraud is committed. This contradicts with the theoretical expectations. It was expected that older employees have more responsibilities, are less likely to be monitored, and are more likely to have accumulated knowledge originating from (previous) work and life experiences that can strengthen their 'ease' (Mackevicious & Giriunas, 2013; Fathi et al., 2017; Giniger et al., 1983; Li et al., 2013). However, it seems that this is not the case. There is a possibility that instead of an increase in age, the relationship between an employee's function or length of employment on 'the ease' increases for employees who are also high(er) educated. This could improve their intellectual capabilities to understand, locate, and exploit weaknesses in the internal controls; literature is consistent that fraudsters are often highly educated (ACFE, 2020; Wolfe & Hermanson, 2004; Holtfreter, 2005; Carroll, 2015). ACFE (2020) stated that 64% of fraudsters have a university degree. In this study, this possible moderator could not be examined due to a limitation; educational level had 315 missing values. Future research is advised to examine the possibility that an employee's level of education could be a moderator instead of age.

Even though it was not part of the research question, the study also tested whether age directly affected 'the ease' (see Appendix E). However, this was also not the case. A possible explanation for this could be that it is not so much the chronological age of the employees that could make it easier to commit fraud, but their organizational age or tenure in the specific organization that does. One might be old(er) but fairly new (a short tenure) to the organization, and therefore do not know the specific weaknesses of that organization and possess over the corresponding capabilities to exploit these.

5.2 Overall conclusion

Relating back to the explanatory research question, the conclusion is that the length of employment is a significant contributing explanatory factor to the ease of committing fraud. This also concludes, relating to the rephrased descriptive question, that tenure is the most important personal characteristic in relation to 'the ease' of spotting and exploiting weaknesses in the internal control systems. Thus, fraudsters with a long(er) tenure have an

elevated risk of committing fraud because they could be more susceptible to formulate an intrinsic belief about their ease of committing fraud that can conduce to their motivation and ability to justify their actions.

The study contributes to research by investigating for whom occupational fraud might be easier, as fraud motivation, and by examining its relation to chronological and organizational age. Even though ‘the ease’ assessment has methodological limitations, it is a unique measure that combines interviews with actual fraudsters together with the professional judgment of private detectives based on extensive research into each organization. This conclusion underscores the prominence for future scientific research to closely examine and further investigate employees with a long(er) tenure in relation to ‘the ease’ and their corresponding elevated risk of committing fraud.

Furthermore, the study shows its strengths by emphasizing the importance of examining occupational fraud as human behaviour, for it are ‘real people’ who commit fraud (Sampson, 2014). The answer to the descriptive question gives a detailed picture of the characteristics of these ‘real people’ (see section 4.1) with data that can shed light on the dark figure of fraud. Organizations and their policy makers are advised to pay explicit attention to employees with a longer tenure when designing structural measures to limit fraud and use the descriptive insights to help narrow down their focus. In short, fraudsters are more likely to be male, between 36 and 55 years of age, work as an operative and are employed between 0 and 10 years. Based on the available information, most of the fraudsters finished secondary (vocational) education, work in a company with >100 employees, are key carriers and have a positive image in the organization. The most common motivator was ‘it was easy’ followed by financial motivations.

5.3 Policy advice for organizations

As stated in the introduction, occupational fraud is the biggest fraud threat any organization faces. On average, it costs an organization approximately 5% of total revenue per year (ACFE, 2020). In non-material terms, it can also undermine internal trust, inhibit organizational success, and damage the organization’s reputation. So, organizations have good reasons to want to avoid occupational fraud.

This final section answers the policy question:

“How can organizations best use this knowledge to prevent and limit employee fraud?”

The advice consists of three types of insights: (1) *implement audits*, (2) *include the perspective of human behaviour*, and (3) *take 'the ease' into account*. Combining these three can reinforce their effect.

(1) Implement audits

Detecting fraud is not an easy task and it should therefore be done by professional auditors who have specific experience and expertise to assess potential weaknesses in the internal control mechanisms and evaluate and enhance its effectiveness (IIA, 2019; Mackevicius & Giriunas, 2013; Coram et al., 2006). The auditors systematically review documents and transactions, verify financial statements and assets, and analyze current fraud trends and data to detect and deter fraud (Albrecht et al., 2008; Coram et al., 2006; Wells, 2002; IIA, 2019). Audits are an essential part of the corporate governance structure. According to many researchers, audits improve risk management and can prevent and deter fraud (ACFE, 2020; Vona, 2012; Norman et al., 2010; Coram et al., 2006; Wells, 2002; Petraşcu & Tieanu, 2014; Murdock, 2008).

Human resource management (HRM) policies and instruments should stimulate an open and non-hierarchical culture where mutual feedback is appreciated and integrity is a core value (Boselie, 2014; Huberts, 2018). Employees are by far the best 'tool' to detect fraud; tips detect 43% of all fraud, and half of those tips are from employees (ACFE, 2020). Tips are likely to be reported to auditors and direct supervisors. Therefore, organizations should strive for an open culture where employees feel safe to report suspicions of possible fraud, where they are not seen as nest polluter or obnoxious whistleblower. Audits should be seen as a normal procedure, part of the (security) culture, and not as a personal attack or mistrust.

Auditing can be outsourced to external auditors independent of the organization or done internally by an auditing department. Considering that the average loss of fraud per organization is 5% on a yearly basis, any expense that is below 5% to deter fraud should be deemed justifiable. If the finances allow, an internal department could be a worthwhile investment because they are likely to have more in-depth knowledge of the organization's internal controls; evidence suggests that internal audits are more effective (Coram et al., 2006). Internal audits are the second-best fraud detection tool (after tips from employees); 15% of occupational fraud is detected by internal audits and 4% by external audits (ACFE, 2020). However, as Wells (2002) explains, what is most important is that audits are done, be it internally or externally, because knowing that audits will be performed discourages employees from engaging in fraudulent behaviour.

(2) Include the perspective of human behaviour

Solid internal protocols and extensive controls systems will decrease opportunities and raise the bar in terms of required capabilities, limiting the risk of occupational fraud (IIA, 2019; ACFE, 2020; Mansor & Abdullahi, 2015; Rae & Subramaniam, 2008; Buckhoff, 2002).

However, Winter (2019) describes how increasing internal control and compliancy requirements slowly but surely ‘suffocate’ employees to the degree of dehumanizing organizations. It also makes them less motivated and decreases the employee’s autonomy (Pink, 2009). Therefore, auditors should ponder in their advisements that there is a limit to protocols and internal controls; it should not ‘suffocate’ employees.

In light of this, auditors are advised to examine occupational fraud as *human behaviour*; it is ‘real people’ who commit fraud (Sampson, 2014). Instead of primarily assessing, improving, and increasing internal controls broadly for the entire company, the auditors should be more oriented towards specific employees with an elevated risk of committing fraud. Auditors can use the descriptive insights of the characteristics of fraudsters from section 4.1 and the overall conclusion (section 5.2) to get a general picture of who these ‘real people’ are and thus who should be more likely to be targeted.

Furthermore, the audits should be periodic (*also see insight 3*). Targeting specific employees on a periodic basis would not only reduce fraud, but also saves money (as less auditing will be needed) and can prevent from ‘suffocating’ employees. It can be assumed that periodic (re-)assessments will be effective; employees are evenly discouraged to engage in fraudulent behaviour if they know that auditors were, are, or will be present in the organization (Wells, 2002). Insight (3) helps to further specify *who* to target and *when* auditors should be doing so, based on ‘the ease’.

3) Take ‘the ease’ into account

Given that fraud cannot be committed without an opportunity and that opportunities mostly arise due to weaknesses in the internal control mechanisms (Rae & Subramaniam 2008), auditing should be focused on employees who can more easily spot opportunities and have the capabilities to exploit these. Thus, it is recommended to take ‘the ease’ into account. This study offers two recommendations for this focus.

Firstly, focus audits on employees in a position of trust and/or power, those that occupy a high(er) function or have a long(er) tenure with the organization. When considering whom to audit, the organization should not neglect that the auditors report to managers and directors who themselves are likely to hold a position of trust and power and thus are more likely to

have the power to override controls and to have the capacity to understand them (Wolfe & Hermanson, 2004; Holtfreter, 2005; Vona, 2012; ACFE 2014; Suh et al., 2019). ACFE (2020) stated that managers and directors commit 55% of frauds; they should thus also be a primary focus for auditors. This would address the previously mentioned classical dilemma ('who guards the guardians') and give them the feeling that they too are being monitored, which could inhibit their decision to commit fraud. Moreover, auditing employees with positions of power and trust would help to confirm, the earlier mentioned, culture of integrity. Furthermore, extra attention must be paid to employees who occupy functions where the division of responsibilities and authorizations is poor, e.g. having authority over tasks and also executing them. When duties are not separated, it can provide employees with incompatible responsibilities that create opportunities for fraud (Buckhoff, 2002).

Secondly, pay extra attention to the tenure of employees. This study shows that employees who are employed for 11 years or longer can more easily commit fraud. These employees have an elevated risk to fraud because their longer tenure increases their ability to spot weaknesses in the internal controls and their capabilities to exploit these (Fathi et al., 2017; Wolfe & Hermanson, 2004; Gagliardi, 2014; Daigle et al., 2009; ACFE, 2020). In this, auditors should recognize that experience resulting from performing a certain combination of (e.g. financial) tasks in a function repeatedly could even be at greater risk to have these 'benefits' (Wolfe & Hermanson, 2004). Therefore, periodic audits should investigate employees before they reach 10 years of employment, at the latest. To be on the safe side it is recommended that organizations implement individual periodic audits, based on tenure, starting after around 5 years of employment.

To summarize: hold periodic personal audits, focus on particular employees with an elevated risk (e.g. greater 'ease') to commit fraud, and above all invest in stimulating a culture of integrity.

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APPENDIX A. *Extra information on Hoffmann*

This Appendix provides additional information on Hoffmann if the reader wishes to know more about the organization, the certifications and training, Hoffmann's position in the current market, and the methods of investigation. The information in this Appendix has been partly obtained through various conversations with Hoffmann's private detectives and from Hoffmann's website (Hoffmann, 2021).

The organization

For the past 60 years, Hoffmann has used its assets and knowledge to prevent possible incidents and crises of their clients. Many of Hoffmann's employees have worked there for a long time, and the knowledge, expertise, and experience has built up over the years. They apply preventive and repressive methods to aid their clients. Preventive cybersecurity measures and security risk management are used to advise and enhance safety within their client's organizations. By performing risk assessments, Hoffmann can give insights into the client's potential risks. Subsequently, Hoffmann can determine if and where immediate attention is needed to secure information and reduce the chance of becoming a victim of fraud, cybercrime, or espionage. They do observations, desk research, have conversations with stakeholders, and provide tools to become legally stronger. Furthermore, clients can hire Hoffmann's certified private detectives to do extensive investigative research in (possible) fraud and integrity violations. In their approach, they pay explicit attention to the behaviour of the employees. Hoffmann strives to create an open working culture and a safe environment for its clients. According to them, this is the long-term solution to combat fraud and integrity violations.

Certifications and training

Hoffmann and its detective force are fully licensed to operate by the Dutch Ministry of Security and Justice, under the 'Wet particuliere beveiligingsorganisaties en recherchebureaus' (Wpbr) (translated: 'private security organizations and investigation agencies Act'), and the 'de Regeling en Beleidsregels particuliere beveiligingsorganisaties en recherchebureaus' (Rpbr en Bpbr) (translated: 'Regulation and Policy rules for private security organizations and investigation agencies Act') (Justis, 2021). Furthermore, they have been certified with the 'ISO 27001' (International Organization for Standardization), which means that they meet all security requirements for their Information Security Management Systems (ISMS).

The training for Hoffmann's private detectives can be followed at numerous organizations,

Hoffmann's private detectives are most often trained by the SVPB. The SVPB (2021) is an abbreviation for the: 'Stichting Vakexamens voor de Particuliere Beveiligingsorganisaties' (translated: 'Foundation for the Examination of Private Security Organizations'). The SVPB is currently the only examination organization to conduct exams for security diplomas and certificates approved by the Dutch Ministry of Security and Justice. After obtaining the required exams, permission must be received for each employee from the authorized chief of the regional police or the commander of the Royal Netherlands Marechaussee. Furthermore, all employees are screened by the police and are only granted approval of their security and investigative activities in the private security sector if they have the required diploma and pass the screening.

Hoffmann's position in the current market

Hoffmann and their dataset are in a unique position on the current market of private (cyber)security and investigations agencies. This is because Hoffmann is situated between the large accountancy agencies and the smaller private investigation agencies.

There are many smaller private investigation agencies, also known as "1-pitters". These are agencies that deal with private (fraud) affairs. A 1-pitter often has expertise in a particular area, with a lot fewer resources at their disposal. Therefore, if a 1-pitter receives a complex or large investigation assignment, they are more likely to need another party that facilitates them with other areas of expertise. As a result, these small investigation agencies often do not receive complex or large assignments. In contrast, Hoffmann has a lot of in-house expertise and can switch swiftly between them. Therefore, they are more likely to receive complex assignments.

The very large accountancy firms also conduct fraud investigations, but they often have to comply with accountancy rules when doing investigations. For example, if an accountant wants to talk to someone, they must send their questions in advance that must comply with certain rules. In addition, large accountancy firms are often also listed on the stock exchange, which means that they must also comply with other additional obligations. As Hoffmann is not an accountancy bureau and also not listed on the stock exchange, they are less bound by specific compliancy rules for conducting research.

Elaboration on the methods of investigation

After an assignment comes in from a client, through for example, the sales department, the certified private detectives get to work. The detectives often work in teams of two to combine their expertise and divide tasks. For example, their assignment could be to investigate

whether an employee of a particular client is a potential fraudster. They start with a preliminary discussion with the client and assess what information is available and what information is needed to conduct the research. After which, the specific action plan is determined. This plan is often not fixed and can be adjusted along the way during the research process because knowledge about a certain situation may change as they investigate further into the organization and the potential fraudsters. Some assignments are relatively short (e.g. weeks); for example, if there is already hard evidence (e.g. CCTV footage), then the detectives just need to confront the fraudster to obtain a confession. However, the assignments are often long trajectories (e.g. months) that need extensive research into the organization and the (potential) fraudster.

While investigating, the private detectives keep track of the investigation's progress in a report. To gather information about the (potential) fraudster and the fraudulent act, detectives use various methods described in chapter 3.1. The methods are case-specific. For instance, when a hospital employee is suspected of committing fraud by stealing medicine, it might be best to observe them by placing a CCTV camera and confront them with the video images afterwards. However, if the fraud has a financial character, it might be better suited to go through administrative files to find evidence. Furthermore, conversations can be held with colleagues of the potential fraudster to obtain information. However, this is not always the case, as sometimes the fraud case must stay very discrete. For example, in some fraud cases, if other employees would find out about it due to these conversations, it could negatively impact the image or reputation of the company. Then it is most likely that the detectives talk with the fraudster's superiors.

When determining the suitable method of investigation, explicit thoughts go out to the proposed methods' proportionality, subsidiarity, and efficacy. The relatively least onerous means must be used in their research, which often depends on the perceived severity of the fraud case for the client. In most cases, the findings are discussed with the (potential) fraudster via interviews. These conversations can be informative (e.g. solely asking some 'soft' questions) or more confrontational (e.g. confronting them with 'hard' evidence). They are often both, as conversations start by asking some simple questions about, for example, the (potential) fraudster's life, career, length of employment, and hobbies. The (potential) fraudsters can have 'good' reasons to commit fraud, and hearing someone's story is the moment when the detectives get the best impression about the motives of a fraudster. The motivations of the fraudsters that are filled into the administrative form are based on the information that originates from these conversations, extensive research into organizational

context (e.g. examining internal control mechanisms, conversations with the superiors), and investigative research into the fraudsters themselves if the detectives have legal interest (e.g. (digital) research to check private matters, life events, debts, etc.)

The conversations with the (potential) fraudsters are all voluntary and in a confidential setting. The concerned person can always walk away. Voluntariness is very important, not only for legal purposes but also because this often gives the concerned person the feeling that they can tell their whole story. One might wonder why (potential) fraudsters would cooperate if the interviews are voluntary. However, they seldom walk away. A reason for this could simply be that they want to defend themselves and know in the back of their minds that walking away is a big plus on their suspicion. For example, the concerned person often wonders: “if I walk away or do not want to talk to Hoffmann’s detectives, what will my employer think of this?”. Question marks will most definitely arise at the client and Hoffmann’s detectives if a potential fraudster does so. They could also stay out of curiosity or a sense of hierarchy, loyalty, or guilt.

APPENDIX B. Hoffmann's administrative form

Administrative form

Begindatum:	<input type="text" value="--"/>	<input type="button" value="📅"/>
Bedrijfsomvang:	<input type="text" value="v"/>	
Soort bedrijf/organisatie	<input type="text" value="v"/>	
Geslacht betrokkene	<input type="text" value="v"/>	
Status	<input type="text" value="v"/>	
Sleuteldrager	<input type="text" value="v"/>	
Opgegeven reden		
Financieel	<input type="checkbox"/>	
Het ging gemakkelijk	<input type="checkbox"/>	
Frustratie	<input type="checkbox"/>	
Spanning	<input type="checkbox"/>	
Onder chantage	<input type="checkbox"/>	
Anders namelijk:	<input type="text"/>	
Leertijdsindicatie:	<input type="text" value="v"/>	
Functieomschrijving:	<input type="text" value="v"/>	
Imago betrokkene in bedrijf	<input type="text" value="v"/>	
Opleidingsniveau	<input type="text" value="v"/>	
Partner op de hoogte	<input type="text" value="v"/>	
Soort onregelmatigheid	<input type="text" value="v"/>	
Toegepaste sanctie:	<input type="text" value="v"/>	
Lengte dienstverband	<input type="text" value="v"/>	
Gescreend	<input type="text" value="v"/>	

Opmerkingen: Verzoek

Notes: For the 'opgegeven reden' or 'specified reason' the private detectives can check multiple categories, meaning that a fraudster can have multiple motivations. However, this is not common. Of all fraud cases, the fraudsters were assessed to have two motivations in 40 cases, and three motivations in 3 cases. If the private detectives did not check the box for a specific motivation, they can fill in an open field and provide an explanation at 'anders namelijk:' or 'other, namely:'. However, these are not always filled in. It can be all kinds of reasons that cannot be assessed as easy, financial, frustration, tension, and blackmail, such as: the fraud was committed because the fraudster was starting his own company, the fraudster has an addiction or other psychological problems that motivated them to commit fraud, or the fraud was committed to help friends or family.

Translation of the variables with answer categories (Dutch to English):

<i>Variable in Dutch:</i>	<i>Variable in English:</i>	<i>Answer categories in Dutch:</i>	<i>Answer categories in English:</i>
Begin datum	Start date	Dag van start onderzoek wordt ingevuld	Day of the start of the research is filled in
Bedrijfsomvang	Company size	< 20, 20-50, 50-100, >100	< 20, 20-50, 50-100, >100
Soort bedrijf / organisatie	Type of company / organization	Productie / Dienstverlening / Zorginstelling / Onderwijsinstelling / Groot en detailhandel / (Semi)overheid/ Handelsbedrijven / Industrie/ Advocatuur/ Anders/ Instellingen overig	Production / Service extension / Healthcare institution / Educational institution / Wholesale and retail trade / (Semi) government / Trading companies / Industry/ Attorney's office / other institutions
Geslacht betrokkene	Gender of the person concerned	Man / Vrouw	Male / Female
Status	Status	Partner / Geen partner / Onbekend	Partner / No partner / Unknown

Translation. Continued.

<i>Variable in Dutch:</i>	<i>Variable in English:</i>	<i>Answer categories in Dutch:</i>	<i>Answer categories in English:</i>
Sleuteldrager	Key carrier	Ja / Nee / Onbekend	Yes / No / Unknown
Opgegeven reden	Specified reason	Een of meer van de volgende redenen kan worden gekozen: 1. Financieel 2. Het ging gemakkelijk 3. Frustratie 4. Spanning 5. Onder chantage 6. Anders namelijk:	One or more of the following reasons can be chosen: 1. Financial 2. It was easy 3. Frustration 4. Tension 5. Under blackmail 6. Other namely:
Leeftijdsindicatie	Age indication	18-25, 26-35, 36-45, 46-55, 56-60 of 60+ jaar oud	18-25, 26-35, 36-45, 46-55, 56-60 or 60+ years of age
Functieomschrijving	Function description	Uitvoerend / Management / Directie	Operative / Management / Director
Imago betrokkene in bedrijf	Image of the person concerned	Positief / Negatief / Onbekend	Positive / Negative / Unknown

Translation. *Continued.*

<i>Variable in Dutch:</i>	<i>Variable in English:</i>	<i>Answer categories in Dutch:</i>	<i>Answer categories in English:</i>
Opleidingsniveau	Educational level	Laag opgeleid (LO), Middelbaar opgeleid (MO), Middelbare beroepsopleiding (MBO), Hogere beroepsopleiding (HBO), Universitair, Onbekend	Lower schooled (LO) / Middle schooled (MO&MBO) / Higher schooled (HBO) / University, Unknown
Partner op de hoogte	Partner informed	Ja / Nee / Onbekend	Yes / No / Unknown
Soort onregelmatigheid	Type of irregularity	Met geld / Met goederen / Met verslaving / Contractbreuk / Met gegevens / Met tijd / Overige / Anders namelijk	With money / With goods / With addiction / Breach of contract / With data / With time / Other / Other, namely

Translation. Continued.

<i>Variable in Dutch:</i>	<i>Variable in English:</i>	<i>Answer categories in Dutch:</i>	<i>Answer categories in English:</i>
Toegepaste sanctie	Applied sanction	Ontslag (op staande voet) / Einde dienstverband regeling / Vaststellingsovereenkomst / Waarschuwing / Geen / Boete / Onderling geregeld / Anders namelijk:	Dismissal (with immediate effect) / End of employment arrangement / Settlement agreement / Warning / None / Fine / Mutually arranged / Other, namely:
Lengte dienstverband	Length of employment	<1, 1, 2, 3, 4, 5, 6-10, 11-20, 21-30, 31-35 of > 36 in jaren dienstverband	<1, 1, 2, 3, 4, 5, 6-10, 11-20, 21-30, 31-35 or > 36 in years of employment
Gescreend	Screened	Ja / Nee / Onbekend	Yes / No / Unknown
Opmerkingen: verzoek	Remarks: request	Een open veld dat kan worden ingevuld als het nodig is	An open field that can be filled in when needed

APPENDIX C. *Descriptive statistics of the full sample compared to the study's sample*

The full sample. Originally there were 897 cases in the dataset, however 394 cases could initially not be included; these cases are excluded because they did not lead to actual fraudsters. This is because not every investigation leads to a fraudster or a concerned person actually confessing. In some investigations, the private detectives are merely observing or doing a sweep in their client's organization, and no results were found. Furthermore, the client can stop the investigation before the investigation is finished (e.g. for monetary reasons). This leaves 503 fraudsters in the full dataset.

The study's sample. After excluding the missing values of the variables that were taken into the analysis, this left 450 fraudsters.

In table 9 (see below), the descriptive statistics of all variables of the 450 fraudsters in the study's sample are described. Table 10 (see below) shows the descriptive statistics of the full sample (503 fraudsters). Furthermore, table 11 (see below) shows if the means of the variables in the full sample significantly differ from the study's sample by performing T-tests. The insights from the tables are used to check if the study's sample does not significantly differ from Hoffmann's full sample. If there are substantial differences, these can be addressed and interpreted. If there are no substantial differences, this would indicate that the study's sample represents the group of fraudsters as included in Hoffmann's full dataset. In other words, if this is the case, the fraudsters included in the study's sample reflect the (characteristics of the) fraudsters included in the full sample.

Table 9 shows that all the variables have the same (approximate) mean and standard deviation as the variables in table 10. To interpret the visual differences between the means more easily, both the mean of the full sample and the study's sample are shown in table 11; there are no substantial visual differences. To further examine potential differences, paired-samples T-tests are run. This statistically tests if there are significant differences between the means of the study's sample and the full sample. From table 11, it can be derived that none of the T-tests are significant, this indicates that the means are not significantly different from each other. These comparisons demonstrate that the distribution of the variables in the full sample corresponds with the study's sample. Thus, this shows that the study's sample represents and reflects the group of fraudsters (and their characteristics) as included in Hoffmann's full dataset.

Table 9. Univariate analysis of the study's sample: descriptive statistics of all variables.

	Valid N	Missings	Min	Max	Mean	S.D.
Function	438	12	1	3	1.25	.537
Length of employment	450	0	1	3	1.49	.729
Age	450	0	1	3	1.89	.685
Gender	450	0	0	1	.33	
Company size	438	12	1	4	3.34	
Type of organization	443	7	1	10	4.09	2.644
Status partner	188	262	0	1	.78	
Key carrier	235	215	0	1	.68	
Image	201	249	0	1	.68	
Educational level	177	273	1	5	2.77	1.008
Partner informed	122	328	0	1	.34	
Type of irregularity	305	145	1	7	2.63	2.081
Sanction	262	188	1	7	2.84	2.668
Screened	63	387	0	1	.10	
Specified reason						
<i>Financial</i>	450	0	0	1	.23	
<i>Ease</i>	450	0	0	1	.24	
<i>Frustration</i>	450	0	0	1	.05	
<i>Tension</i>	450	0	0	1	.02	
<i>Blackmail</i>	450	0	0	1	.01	

Note: Function (1 = operative, 2 = manager, 3 = director); Length of employment (1 = short-term, 2 = medium-term, 3 = long-term); Age (1 = young, 2 = middle-aged, 3 = old); Gender (0 = male, 1 = female); Company size (1 = <20, 2 = 20 50, 3 = 50 100, 4 = >100); Type of organization (1 = production, 2 = service extension, 3 = healthcare institutions, 4 = educational institutions, 5 = wholesale and retail trade, 6 = (semi)government institutions, 7 = trading companies, 8 = industry, 9 = attorney's office, 10 = other); Status partner (0 = no partner, 1 = partner); Key carrier (0 = not a key carrier, 1 = key carrier); Image (0 = negative image, 1 = positive image); Educational level (1 = LO, 2 = MO, 3 = MBO, 4 = HBO, 5 = University); Partner informed (0 = partner not informed, 1 = partner informed); Type of irregularity (1 = money, 2 = goods, 3 = addiction, 4 = data, 5 = time, 6 = break of contract, 7 = other); Sanction (1 = dismissal, 2 = settlement agreement, 3 = warning, 4 = fine, 5 = mutually arranged, 6 = no sanction, 7 = other/blank); Screened (0 = not screened, 1 = screened); Financial, ease, frustration, tension, blackmail (0 = no, 1 = yes), e.g. financial: 0 = not financially motivated, 1 = financially motivated.

Table 10. Univariate analysis of the full sample: descriptive statistics of all variables.

	Valid N	Missings	Min	Max	Mean	S.D.
Function	466	37	1	3	1.25	.539
Length of employment	454	63	1	3	1.44	.706
Age	464	39	1	3	1.89	.686
Gender	503	0	0	1	.32	
Company size	489	14	1	4	3.33	1.002
Type of organization	494	9	1	10	4.15	2.665
Status partner	206	297	0	1	.77	
Key carrier	254	249	0	1	.68	
Image	217	286	0	1	.68	
Educational level	188	315	1	5	2.78	1.019
Partner informed	133	370	0	1	.34	
Type of irregularity	334	169	1	7	2.65	2.104
Sanction	284	219	1	7	2.85	2.682
Screened	68	435	0	1	.09	
Specified reason						
<i>Financial</i>	503	0	0	1	.22	
<i>Ease</i>	503	0	0	1	.22	
<i>Frustration</i>	503	0	0	1	.05	
<i>Tension</i>	503	0	0	1	.02	
<i>Blackmail</i>	503	0	0	1	.01	

Note: Function (1 = operative, 2 = manager, 3 = director); Length of employment (1 = short-term, 2 = medium-term, 3 = long-term); Age (1 = young, 2 = middle-aged, 3 = old); Gender (0 = male, 1 = female); Company size (1 = <20, 2 = 20 50, 3 = 50 100, 4 = >100); Type of organization (1 = production, 2 = service extension, 3 = healthcare institutions, 4 = educational institutions, 5 = wholesale and retail trade, 6 = (semi)government institutions, 7 = trading companies, 8 = industry, 9 = attorney's office, 10 = other); Status partner (0 = no partner, 1 = partner); Key carrier (0 = not a key carrier, 1 = key carrier); Image (0 = negative image, 1 = positive image); Educational level (1 = LO, 2 = MO, 3 = MBO, 4 = HBO, 5 = University); Partner informed (0 = partner not informed, 1 = partner informed); Type of irregularity (1 = money, 2 = goods, 3 = addiction, 4 = data, 5 = time, 6 = break of contract, 7 = other); Sanction (1 = dismissal, 2 = settlement agreement, 3 = warning, 4 = fine, 5 = mutually arranged, 6 = no sanction, 7 = other/blank); Screened (0 = not screened, 1 = screened); Financial, ease, frustration, tension, blackmail (0 = no, 1 = yes), e.g. financial: 0 = not financially motivated, 1 = financially motivated.

Table 11. T-tests: comparing the means of the full sample with the study's sample.

	Valid N Full sample	Valid N Study's sample	Mean Full sample	Mean Study's sample	T-test	Sig. (p value, 2 tailed)
Function	466	450	1.25	1.25	-.184	.854
Length of employment	454	450	1.44	1.49	-1.448	.148
Age	464	450	1.89	1.89	-.599	.550
Gender	503	450	.32	.33	-.349	.727
Company size	489	438	3.33	3.34	.615	.539
Type of organization	494	443	4.15	4.09	.523	.601
Status partner	206	188	.77	.78	1.350	.182
Key carrier	254	235	.68	.68	1.264	.209
Image	217	201	.68	.68	-1.153	.252
Educational level	188	177	2.78	2.77	-.100	.921
Partner informed	133	1	.34	.34	1.446	.162
Type of irregularity	334	305	2.65	2.63	1.515	.131
Sanction	284	262	2.85	2.84	1.649	.102
Screened	68	63	.09	.10	1.000	.337
Specified reason						
<i>Financial</i>	503	450	.22	.23	-1.031	.303
<i>Ease</i>	503	450	.22	.24	-.856	.392
<i>Frustration</i>	503	450	.05	.05	-.149	.882
<i>Tension</i>	503	450	.02	.02	-.242	.809
<i>Blackmail</i>	503	450	.01	.01	-.378	.706

APPENDIX D. *Sensitivity analysis: continuous models, assumptions, correlation table, and results*

Continuous models of analysis

In these six models (model 7 to 12, in table 14 to 16) either a simple binary logistic regression (SBLR) or a multiple binary logistic regression (MBLR) is used. The dependent variable in all models is the dichotomous variable ‘the ease by which fraud is committed’, also referred to as ‘the ease’. All explanatory variables in the models are treated as continuous variables to assess whether the results are sensitive to how the variables are treated (categorical vs continuous). For the continuous predictors, the odds ratio relates to the change in the odds of the outcome when the predictor increases with one unit. The results from the sensitivity analysis can complement the findings from the categorical models to answer the research questions.

In model 7, in table 14, a SBLR is used to test the direct relationship between an employee’s function and ‘the ease’. Model 8, in this table, tests the same relation with the addition of the control variable gender in a MBLR.

Model 9, in table 15, is a SBLR that tests the direct relationship between an employee’s length of employment and ‘the ease’. In model 10, in this table, the control variable gender is added in a MBLR.

In model 11, in table 16, the moderator interaction term age (age*function) is added to model 8 in a MBLR. In model 12, in this table, the moderation interaction term age (age*length of employment) is added to model 10, also in a MBLR.

Assumptions of the continuous models

The same assumptions of a binary logistic regression are again evaluated as previously done in section 3.4.3. For assumption (1) and (2), nothing changes; both assumptions are met. Assumption (3) is also met; the examination of table 12 shows that no multicollinearity is present because all VIF scores are below 10 and the tolerance is not below .10. Table 13 shows the Pearson correlations between the different variables, all values are below .05 and there are no values close to 1. This indicates that the variables are not highly correlated with each other. Assumption (4) is also met; the casewise plot produced in SPSS for every logistic regression model indicated no outliers. Finally, after examining the results of the Box-Tidwell test in SPSS, the fifth assumption of the linearity of the independent variables and log odds is met. To test this, a ‘natural log’ or ‘Ln’ of the predictors is computed, and a constant is added to each variable so that no values will have zero or less. Next, interactions

terms are created between the continuous predictors and their logs. Linearity was found in all comparisons between each of the continuous independent variables and the log odds of the outcome variable because none of these interaction terms were significant. Assumption (6) is also met; the sample size is large enough (N=450) and each independent variable has a least frequent outcome of >10. Furthermore, when including all the variables, the model fits the data because the Hosmer and Lemeshow test is again not significant (p=.515).

Table 12. Tolerance and VIF scores: continuous variables.

Variable	Tolerance	VIF
Function (operative, manager, director)	.934	1.071
Length of employment (short, medium, long)	.774	1.292
Age (young, middle, old)	.753	1.328
Gender	.936	1.068

Table 13. Pearson correlation table: continuous variables.

	'The ease'	Function	Length of employment	Age	Gender
'The ease'	1	.049	.119*	.056	-.059
Function	.049	1	.061	.149**	-.228**
Length of employment	.119*	.061	1	.475**	-.076
Age	.056	.149**	.475**	1	-.140**
Gender	-.059	-.228**	-.076*	-.140**	1

Notes: N=450; *p<.05, **p<.01, ***p<.001; two-sided test with Pearson's correlation coefficient.

The ease = the ease by which fraud is committed.

Results: function, sensitivity analysis with continuous models

Table 14. Binary logistic regression analyses for variables predicting the ease by which fraud is committed.

	Model 7		Model 8	
	OR	95% CI	OR	95% CI
Constant	.247***		.285***	
Function	1.226	[.837, 1.796]	1.167	[.788, 1.729]
Gender			.773	[.476, 1.255]
Nagelkerke pseudo-R ²	.004		.007	
-2 Log likelihood	497.207		496.103	
χ^2	1.059		2.162	

Notes: dependent variable = the ease by which fraud is committed. N=450, *p<.05, **p<.01, ***p<.001.

In table 14, model 8, function is treated as a continuous variable with the addition of the control variable gender. The findings of model 8 are in line with the findings of model 7, thus only model 8 will be interpreted. The overall model again explains 0.7% of the variance in ‘the ease’ and according to the omnibus test of model coefficients the model is again not significantly better at predicting the outcome ($\chi^2=2.162$, $p=.339$). The control variable gender is again not significant (OR=.773, $p=.298$). Furthermore, a positive but not significant direct effect was found between function and the ease by which fraud is committed (OR=1.167, $p=.440$). These findings are in line with the findings of the categorical model (model 2), which also prove to be non-significant. This indicates that the results are not sensitive to how these variables are treated.

Results: length of employment, sensitivity analysis with continuous models

Table 15. Binary logistic regression analyses for variables predicting the ease by which fraud is committed.

	Model 9		Model 10	
	OR	95% CI	OR	95% CI
Constant	.183***		.202***	
Length of employment	1.434*	[1.082, 1.901]	1.417*	[1.068, 1.880]
Gender			.773	[.480, 1.244]
Nagelkerke pseudo-R ²	.020		.024	
-2 Log likelihood	492.125		490.979	
χ^2	6.140*		7.286*	

Notes: dependent variable = the ease by which fraud is committed. N=450, *p<.05, **p<.01,

***p<.001.

In table 15, model 10, the length of employment is included as a continuous variable and the control variable gender is added. The findings of model 10 are in line with the findings of model 9, thus only model 10 will be interpreted. The overall model explains 2.4% of the variance in ‘the ease’. This is a slight decrease when comparing it to the model that treated the length of employment as categorical (3.4%). The model is better at predicting the outcome because the omnibus test of model coefficients is significant ($\chi^2=7.286$, $p<.05$). Gender is again a non-significant control variable (OR=.773, $p=.289$). The direct effect of length of employment on the ease by which fraud is committed is positive and significant (OR=1.417; 95% CI=1.068, 1.880; $p<.05$). There is an approximate predicted 41.7% (1.417) increase in the odds that the fraud will be assessed to be easy if the fraudster shifts to the subsequent length of employment category. The increase in odds from short-term to long-term (>21 years) is $1.417*1.417 = 2.008$ (100.8%). Thus, for long-term employed the odds to be assessed in the group of fraudsters for whom it was easy increase with 2.008 (100,8%). This suggests that the relationship between the length of employment and the ease by which fraud is committed is linear. The categorical model (model 4) does not show this linearity because the long-term category does not significantly differ compared to the short-term category. This indicates that the results are sensitive to how these variables are treated.

Results: moderator age, sensitivity analysis with continuous models

Table 16. Binary logistic regression analyses for variables predicting the ease by which fraud is committed.

	Model 11		Model 12	
	OR	95% CI	OR	95% CI
Constant	.275		.139*	
Function	.935	[.225, 3.890]		
Length of employment			1.952	[.620, 6.148]
Age	1.042	[.451, 2.408]	1.181	[.541, 2.577]
Gender	.791	[.485, 1.289]	.766	[.474, 1.238]
Interaction 1 (age * function)	1.098	[.579, 2080]		
Interaction 2 (age * length of employment)			.874	[.540, 1.415]
Nagelkerke Pseudo-R ²	.010		.025	
-2 Log likelihood	495.142		490.658	
χ^2	3.123		7.607	

*Notes: dependent variable: the ease by which fraud is committed. N=450, *p<.05, **p<.01, ***p<.001.*

In table 16, model 11, the findings are displayed for the interaction term 1 (function*age), which are treated as continuous variables. The overall model explains 1% of the variance in ‘the ease’. The explained variance is slightly less than in the categorical model (2.3%). The omnibus test of model coefficients shows that the model is not statistically significant ($\chi^2=3.123$, $p=.537$), and thus not better at predicting the outcome. None of the variables in this model are significant. Findings show that interaction term 1 is positive but not significant (OR=1.098, $p=.775$).

In table 16, model 12, the findings are displayed for interaction term 2 (length of employment*age), which are treated as continuous variables. The overall model explains 2.5% of the variance in ‘the ease’. This is slightly less than in the categorical model (4.8%). The omnibus test of model coefficients indicates that the model is again not significant ($\chi^2=7.607$, $p=.107$), which means that it is not better at predicting the outcome. None of the explanatory variables in this model seem to be significant. Findings show that interaction term 2 is not significant (OR=.874, $p=.584$). The findings are in line with findings from the categorical models (model 5 & 6), which are also non-significant. This suggest that the results are not sensitive to how these variables are treated.

APPENDIX E. A direct effect of age on ‘the ease’?

In this Appendix, it is checked whether age (categorical or continuous) has a direct effect on ‘the ease’. Model 13, in table 17, includes the categorical variable age (RC=young), with the control variable gender (RC=male) in an MBLR. Model 14, in table 17, includes the continuous variable age, with the control variable gender, also in an MBLR. In neither of the models significant direct results were found between age and ‘the ease’.

Table 17. Multiple binary logistic regression analyses for variables predicting the ease by which fraud is committed.

Variable	Model 13		Model 14	
	OR	95% CI	OR	95% CI
Constant	.327***		.253***	
Age (RC: young)				
<i>middle-aged</i>	.969	[.581, 1.614]		
<i>old</i>	1.436	[.769, 2.679]		
Age (young, middle-aged, old)			1.181	[.859, 1.623]
Gender (RC: male)	.777	[.481, 1.253]	.767	[.476, 1.236]
Nagelkerke pseudo-R ²	.012		.009	
-2 Log likelihood	494.725		495.641	
χ^2	3.540		2.624	

*Notes: Dependent variable = the ease by which fraud is committed. N = 450, *p<.05, **p<.01, ***p<.001. RC = reference category.*

Model 13 explains 1.2% of the overall variance and the omnibus test of model coefficients is not significant ($\chi^2=3.540$, $p=.316$). No overall effect was found (Wald=2.017, $p=.365$). The control variable gender is not significant (OR=.777, $p=.300$). No significant effects were found when comparing middle-aged to young (OR=.969, $p=.903$) and comparing old to young (OR=1.436, $p=.256$).

Model 14 explains .9% of the variance and is again not better at predicting the outcome ($\chi^2=2.624$, $p=.269$) Gender is a not significant control variable (OR=.767, $p=.275$). There was also no significant direct effect of the continuous variable age on ‘the ease’ (OR=1.181, $p=.307$).

APPENDIX F. *Recommendations for Hoffmann's data collection and future research using this data*

Recommendations for Hoffmann to enrich the data

The data Hoffmann has been gathering is possibly unique, but in any case, very special. This section focuses on recommendations that are specifically for Hoffmann, for future enrichment of the data. Incorporating these suggestions would allow Hoffmann to better recognize the employees at greatest risk of committing fraud based on personal characteristics and the ease of committing fraud.

As indicated in the data quality implications in section 3.2, the overall quality of the data is inhibited because the private detectives are not operating from a social science researcher's perspective and the collection of the data is not standardized. Therefore, to improve the overall quality of the data, the following recommendations are proposed and can be summarized as:

- Increase awareness of (testing) the data for scientific research, marketing purposes, and internal use to design tailored preventive measures for those that prove most susceptible to commit fraud. That can subsequently be used to advise clients.
- Change the perspective from 'solely investigating for clients' towards the 'social science researcher's perspective' to increase the data's validity, reliability, and representativeness.
- Standardize the research conditions by using codebooks that include clearly operationalized variables based on existing knowledge and theory to reduce biases and increase the reliability and validity of the measures.
- Introduce a variable in the form that indicates how long an employee has worked in a specific function or has done specific tasks. This can be used to further examine the possibility that performing certain tasks (in a function) repeatedly could increase their ease of committing fraud.
- Introduce differentiation into the ease variable by using two constructs, 'opportunities' and 'capabilities' that are divided into multiple variables to increase the validity and reliability of the ease variable and reduce biases.
- Measure the perceived ease of a fraudster separately, solely based on conversations with the fraudster. This would allow to examine potential differences between the assessment of the ease based on examination of the organizational context done by the detectives and the perceived ease of fraudsters.

The following sections will explain the recommendations in more detail.

To improve the overall quality of the data, the awareness among the detectives of the potential relevance to use it for scientific research must be increased. Moreover, the awareness should be increased that the data and corresponding results are not only interesting and valuable for the detective's themselves but also for Hoffmann's risk management's preventive branch. The data can give them insights into whom commits fraud and for example for whom it is easier to do so. Testing this data, as done in this current study, would allow them to design structured and tailored preventive measures for particular employees that prove (the most) susceptible to commit fraud. Implementing these recommendations will allow Hoffmann to test more reliable and valid data. Subsequently, they can also offer these insights to their clients (e.g. in advice) or use them for marketing purposes (e.g. showing their findings in the media) and incorporate them in fraud prevention measures or tools.

Filling in administrative statistics is not enforced; the detectives are free to do it themselves, whenever they please. Therefore, to increase the external validity, filling in the form should be part of the standard procedure required for a detective to close a file or send the report. Moreover, they should adapt their perspective from 'solely investigating for clients' to the 'social science researcher's perspective'. It is recommended that the private detectives think differently about the variables that are now seen as 'not relevant for every investigation'. Instead, they should think: 'it can be relevant for scientific research and this research can ultimately help to prevent fraud'. In other words, the administrative form should not be seen as merely administrative. This would reduce the number of missing values for each variable and improve the external validity and thus the overall representativeness of the data's sample.

To further improve the overall quality and inherit more of the scientific researcher's perspective, it is recommended that the private detectives use codebooks (e.g. checklists). In this way, they can to some extent standardize the research conditions. This should especially be used for the incentives of the fraudsters. In these codebooks, clear rating instructions must be developed to improve the construct validity of the observations (Morling et al., 2018). These codebooks should contain clear and precise information on how each variable is operationalized. The clearer these are, the more valid it will be; if it is clear what measurements are needed for the different aspects of a certain variable, it is easier to capture all of them in a valid manner and thus increase its content validity (Morling et al., 2018). A step-by-step guide to assess the variables would give the detectives the ability to apply their methods consistently. In this way, the private detectives can increase the reliability of their

judgements, inhibit inter-rater reliability, and subsequently reduce bias (Morling et al., 2018). To further improve the construct validity, the operationalization must be based on and adhere to existing knowledge and theories in the field of fraud. The following sections make recommendations to enrich the data and takes the previously mentioned insights to improve its quality into account.

The further recommendations concern three improvements.

Firstly, Hoffmann's private detectives should incorporate a variable in the form that indicates how long an employee has worked in a specific function or has done specific tasks (in Dutch: *functieverblijftijd*). By incorporating this variable, the private detectives can make a distinction between, for example, the 'overall length of employment' (i.e. the years the fraudster worked for the company) and 'specific length of employment' (i.e. the years the fraudster has worked in a specific function or has done specific tasks). This information can then be used to further examine the possibility that performing a certain combination of tasks (in a function) repeatedly, increases their ease of committing fraud.

The next two recommendations are specifically to reduce biases and improve the validity and reliability of the ease by which fraud is committed, which should be incorporated in the codebooks.

First of all, it is advised to introduce differentiation into the variable 'the ease of committing fraud' by using variables that measure the different components that can be a part of this ease. For instance, Hoffmann's private detectives could divide this ease into two constructs and take these into the administrative form, namely: '*opportunity*' and '*capabilities*'. Subsequently, these constructs can again be divided into multiple variables, deducted from relevant scientific research, which measures these constructs.

Firstly, with regard to *opportunity*, scientific literature suggests four distinctions: (1) assessing if (physical/nonphysical) doors were open for the fraudster, (2) examine the (absence of or ineffective) internal control mechanisms, (3) assess if there was a lack of supervision or monitoring and (4) assess if there is a poor separation of duties (Kenyon & Tilton, 2012; Vance, 1983; Sanusi et al., 2015; Mansor & Abdullahi, 2015).

Secondly, to assess if the fraudster had the *capabilities* to exploit these opportunities Wolfe & Hermanson (2004; Kassem & Higson, 2012, p.194) propose four indicators: (1) "authoritative position or function within the organization", (2) "capacity to understand and exploit accounting systems and internal control weaknesses, (3) "confidence that she/he will not be detected or if caught she/he will get out of it easily", and (4) "capability to deal with

the stress created within an otherwise good person when she commits bad acts”.

These distinctions and indicators are examples and suggestions. These can be more elaborated on (e.g. methods and measures based on other theories and existing knowledge) and made more precise, in consultation with the private detectives, if Hoffmann chooses to incorporate these changes.

Combining the enriched variables of opportunities and capabilities will enable Hoffmann and its detectives to design and advise on targeted prevention to limit (the ease of) fraud. Future research can use the combination of the constructs ‘opportunity’ and ‘capability’ to assess whether it was easy for the fraudster. The different measures of these constructs can lead to more targeted results. For example, if it is known for a specific fraudster due to what opportunities for fraud arise and over which capabilities they possess, more targeted preventive measures can be designed to limit (the ease of) committing fraud. The use of these constructs inhibits the subjectivity of the currently used ease variable and increases the extent to which the results can be reproduced (reliability) and the extent to which the results measures what they are supposed to measure (validity).

Finally, it is recommended to distinguish between the perceived ease of a fraudster and the assessment of the ease done by the private detectives to further increase the validity and reliability and decrease the subjectivity (inhibiting potential biases) of the variable. This would prevent the private detectives from making a judgement call between their assessment (based on the organizational context) and incentives indicated by the fraudsters themselves. The perceived ease should be solely based on the conversation with the fraudster, where the fraudsters can indicate if they felt that the fraud was easy for them to commit or not. To illustrate this with an example: it would make it possible to compare the perceived ease as reported by the fraudster with the ease as assessed by the detective based on the organizational context (measured by opportunity and capability). A discrepancy between these two can be very insightful. If the fraudster or fraudsters indicate that they were motivated because they felt that it was easy to commit the fraud, but the organizational assessment indicates otherwise (e.g. because it seems that the organization has all the proper controls in place), it could be sensible to act on the perceived ease in order to deter possible new fraudsters. This perceived ease could have motivated them to commit fraud, which means that others could be motivated by this as well. An organization could then design new controls to limit the perceived ease or adopt and strict existing controls to inhibit their perceived easiness. The controls should then be re-examined and adapted for specific employees that share similar characteristics (e.g. in terms of demographics, or opportunities

and capabilities) as the fraudster who perceived it as easy. Therefore, it is suggested that researchers and Hoffmann's private detectives, with the presence of discrepancies, also elaborate on what these are and where these are coming from. In other words, it must be critically assessed due to what the perceived ease of the fraudster has arisen. As a result, organizations can do something about this perceived ease to limit fraud.

Asking detectives to fill out a somewhat longer form may be a challenge, but the following would be potentially helpful to entice the cooperation of the detectives:

- Increase the awareness among the detectives of the relevance of (testing) the data for scientific research and using it internally for detectives themselves and Hoffmann's preventive risk management branch for fraud prevention purposes (as previously mentioned in the section above);
- Involve the detectives in the proposed adjustments in the form (e.g. by giving a clear presentation about the adjustments) *and* ask them if they see any other possible improvements;
- Invite the detectives to exchange their individual assessments on several cases to fine-tune the form; this would also be a sort of intervision and would allow to assess the construct validity and inter-rater reliability of the measures;
- Test the adjustments in a small pilot and use the results to decide;
- Provide periodic feedback both in terms of numbers (of cases documented) but especially about the results in simple counts (%) and basic analyses.

Also relevant for Hoffmann's consultancy on fraud prevention and detection is the policy advice described in section 5.3.

Recommendations for future academic research using the new data

This section provides recommendations for future research if Hoffmann would decide to enrich the data by incorporating the suggestions for the ease by which fraud is committed, in the ways described in the previous section. It would take some time to gather enough data on the newly defined variables to statistically analyze the data and make maximum use of the combination with the old data. In view of this study and the used research questions, it would then be of academic interest to research the following questions:

- To what extent does an employee's function have an effect on the opportunities to commit fraud?

- To what extent does an employee's function have an effect on the capabilities to commit fraud?
- To what extent does an employee's (overall or specific) length of employment have an effect on the opportunities to commit fraud?
- To what extent does an employees (overall or specific) length of employment have an effect on the capabilities to commit fraud?

Furthermore, the opportunities and capabilities can be combined to measure the ease of committing fraud:

- To what extent does an employee's function have an effect on the ease (opportunities & capabilities) to commit fraud?
- To what extent does an employee's (overall or specific) length of employment have an effect on the ease (opportunities & capabilities) to commit fraud?

Moreover, the following questions can be used to determine whether there is an effect on the perceived ease of fraudsters to commit fraud:

- To what extent does an employee's function have an effect on the perceived ease to commit fraud?
- To what extent does an employee's (overall or specific) length of employment have an effect on the perceived ease to commit fraud?

Subsequently, potential differences between the perceived ease and the ease determined by the private detectives can be assessed.